CONTRACT BETWEEN THE CITY OF AUSTIN ("City")
AND
("Contractor")

ADVANCED TRAFFIC SOLUTIONS, LLC
for
Traffic Management Software

MA-5600-NC170000039

The City accepts the Contractor's Offer (as referenced in Section 1.1.3 below) for the above requirement and enters into the following Contract.

This Contract is between Advanced Traffic Solutions, LLC. having offices at Katy, Texas 77494 and the City, a home-rule municipality incorporated by the State of Texas, and is effective as of the date executed by the City ("Effective Date").

Capitalized terms used but not defined herein have the meanings given them in Solicitation Number RFP 5600 JTH0309.

1.1 **This Contract is composed of the following documents:**

1.1.1 This Contract

1.1.2 The City's Solicitation, Request for Proposal, JTH0309 including all documents incorporated by reference

1.1.3 Offer, dated February 16, 2017, including subsequent clarifications

1.2 **Order of Precedence.** Any inconsistency or conflict in the Contract documents shall be resolved by giving precedence in the following order:

1.2.1 This Contract

1.2.2 The City's Solicitation as referenced in Section 1.1.2, including all documents incorporated by reference

1.2.3 The Contractor's Offer as referenced in Section 1.1.3, including subsequent clarifications.

1.3 **Term of Contract.** The Contract will be in effect for an initial term of 60 months and may be extended thereafter for up to 2 additional 12 month option(s), subject to the approval of the Contractor and the City Purchasing Officer or his designee. See the Term of Contract provision in Section 0400 for additional Contract requirements.

1.4 **Compensation.** The Contractor shall be paid a total Not-to-Exceed amount of $ 2,100,000 for the initial Contract term and $ 60,000 for each extension option in accordance with the Price Sheet, RFP Section 0601. Payment shall be made upon successful completion of services or delivery of goods as outlined in each individual Delivery Order.

1.5 **Quantity of Work.** There is no guaranteed quantity of work for the period of the Contract and there are no minimum order quantities. Work will be on an as needed basis as specified by the City for each Delivery Order

1.6 **Clarifications and Additional Agreements.** The following are incorporated into the Contract.

1.6.1 None. All City Terms and Conditions accepted as written. .

This Contract (including any Exhibits) constitutes the entire agreement of the parties regarding the subject matter of this Contract and supersedes all prior and contemporaneous agreements and understandings, whether written or oral, relating to such subject matter. This Contract may be altered, amended, or modified only by a written instrument signed by the duly authorized representatives of both parties.

In witness whereof, the City has caused a duly authorized representative to execute this Contract on the date set forth below.

ADVANCED TRAFFIC SOLUTIONS, LLC	CITY OF AUSTIN
ERIC J NELSON	James T. Howard
Printed Name of Authorized Person	Printed Name of Authorized Person
Eric J Nelson	
Signature	Signature
PRESIDENT	PROCUREMENT MANAGER
Title:	Title:
8/4/17	9/5/17
Date:	Date:

CITY OF AUSTIN, TEXAS

Purchasing Office

REQUEST FOR PROPOSAL (RFP)

OFFER SHEET

SOLICITATION NO: RFP JTH0309

DATE ISSUED: 1/9/2017

COMMODITY CODE: 92032

COMMODITY/SERVICE DESCRIPTION: Traffic Management Software

PRE-PROPOSAL CONFERENCE TIME AND DATE: 01/25/2017 11:00 A.M.

LOCATION: 1501 Toomey Road, Austin, Texas 78704
CONFERENCE CALL IN LINE: (512) 974-9300 Participant Code: 521387

FOR CONTRACTUAL AND TECHNICAL ISSUES CONTACT THE FOLLOWING AUTHORIZED CONTACT PERSON:

Jim Howard
Corporate Purchasing Manager

Phone: (512) 974-2031
E-Mail: jim.howard@austintexas.gov

PROPOSAL DUE PRIOR TO: 02/9/2017 2:00 P.M.

PROPOSAL CLOSING TIME AND DATE: 02/9/2017 2:15 P.M.

LOCATION: MUNICIPAL BUILDING, 124 W 8th STREET RM 308, AUSTIN, TEXAS 78701

LIVE SOLICITATION CLOSING ONLINE: For RFP's, only the names of respondents will be read aloud

For information on how to attend the Solicitation Closing online, please select this link:

http://www.austintexas.gov/department/bid-opening-webinars

When submitting a sealed Offer and/or Compliance Plan, use the proper address for the type of service desired, as shown below:

Address for US Mail (Only)	**Address for Fedex, UPS, Hand Delivery or Courier Service**
City of Austin	City of Austin, Municipal Building
Purchasing Office-Response Enclosed for Solicitation # JTH0309	Purchasing Office-Response Enclosed for Solicitation # JTH0309
P.O. Box 1088	124 W 8th Street, Rm 308
Austin, Texas 78767-8845	Austin, Texas 78701
	Reception Phone: (512) 974-2500

NOTE: Offers must be received and time stamped in the Purchasing Office prior to the Due Date and Time. It is the responsibility of the Offeror to ensure that their Offer arrives at the receptionist's desk in the Purchasing Office prior to the time and date indicated. Arrival at the City's mailroom, mail terminal, or post office box will not constitute the Offer arriving on time. See Section 0200 for additional solicitation instructions.

All Offers (including Compliance Plans) that are not submitted in a sealed envelope or container will not be considered.

SUBMIT 1 ORIGINAL, AND 10 ELECTRONIC COPIES (FLASH DRIVE) OF YOUR RESPONSE

*****SIGNATURE FOR SUBMITTAL REQUIRED ON PAGE 3 OF THIS DOCUMENT*****

This solicitation is comprised of the following required sections. Please ensure to carefully read each section including those incorporated by reference. By signing this document, you are agreeing to all the items contained herein and will be bound to all terms.

SECTION NO.	TITLE	PAGES
0100	STANDARD PURCHASE DEFINITIONS	*
0200	STANDARD SOLICITATION INSTRUCTIONS	*
0300	STANDARD PURCHASE TERMS AND CONDITIONS	*
0400	SUPPLEMENTAL PURCHASE PROVISIONS	12
0500	SCOPE OF WORK	7
0600	PROPOSAL PREPARATION INSTRUCTIONS & EVALUATION FACTORS	5
0601	PRICING SHEET	1
0605	LOCAL BUSINESS PRESENCE IDENTIFICATION FORM – Complete and return	2
0700	REFERENCE SHEET – Complete and return if required	2
0800	NON-DISCRIMINATION CERTIFICATION	3
0805	NON-SUSPENSION OR DEBARMENT CERTIFICATION	*
0810	NON-COLLUSION, NON-CONFLICT OF INTEREST, AND ANTI-LOBBYING CERTIFICATION	*
0815	LIVING WAGES CONTRACTOR CERTIFICATION–Complete and return	1
0835	NONRESIDENT BIDDER PROVISIONS – Complete and return	1
0900	MBE/WBE PROCUREMENT PROGRAM PACKAGE NO GOALS FORM – Complete & return	2

*** Documents are hereby incorporated into this Solicitation by reference, with the same force and effect as if they were incorporated in full text. The full text versions of the * Sections are available on the Internet at the following online address:**

http://www.austintexas.gov/financeonline/vendor_connection/index.cfm#STANDARDBIDDOCUMENTS

If you do not have access to the Internet, you may obtain a copy of these Sections from the City of Austin Purchasing Office located in the Municipal Building, 124 West 8th Street, Room #308 Austin, Texas 78701; phone (512) 974-2500. Please have the Solicitation number available so that the staff can select the proper documents. These documents can be mailed, expressed mailed, or faxed to you.

INTERESTED PARTIES DISCLOSURE

In addition, Section 2252.908 of the Texas Government Code requires the successful offeror to complete a Form 1295 "Certificate of Interested Parties" that is signed and notarized for a contract award requiring council authorization. The "Certificate of Interested Parties" form must be completed on the Texas Ethics Commission website, printed, signed and submitted to the City by the authorized agent of the Business Entity with acknowledgment that disclosure is made under oath and under penalty of perjury prior to final contract execution.

https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm

The undersigned, by his/her signature, represents that he/she is submitting a binding offer and is authorized to bind the respondent to fully comply with the solicitation document contained herein. The Respondent, by submitting and signing below, acknowledges that he/she has received and read the entire document packet sections defined above including all documents incorporated by reference, and agrees to be bound by the terms therein.

Company Name: _____

Company Address: _____

City, State, Zip: _____

Federal Tax ID No. _____

Printed Name of Officer or Authorized Representative: _____

Title: _____

Signature of Officer or Authorized Representative: _____

Date: _____

Email Address: _____

Phone Number: _____

*** Proposal response must be submitted with this Offer sheet to be considered for award**

Section 0605: Local Business Presence Identification

A firm (Offeror or Subcontractor) is considered to have a Local Business Presence if the firm is headquartered in the Austin Corporate City Limits, or has a branch office located in the Austin Corporate City Limits in operation for the last five (5) years, currently employs residents of the City of Austin, Texas, and will use employees that reside in the City of Austin, Texas, to support this Contract. The City defines headquarters as the administrative center where most of the important functions and full responsibility for managing and coordinating the business activities of the firm are located. The City defines branch office as a smaller, remotely located office that is separate from a firm's headquarters that offers the services requested and required under this solicitation.

OFFEROR MUST SUBMIT THE FOLLOWING INFORMATION FOR EACH LOCAL BUSINESS (INCLUDING THE OFFEROR, IF APPLICABLE) TO BE CONSIDERED FOR LOCAL PRESENCE.

NOTE: ALL FIRMS MUST BE IDENTIFIED ON THE MBE/WBE COMPLIANCE PLAN OR NO GOALS UTILIZATION PLAN (REFERENCE SECTION 0900).

USE ADDITIONAL PAGES AS NECESSARY

OFFEROR:

Name of Local Firm		
Physical Address		
Is your headquarters located in the Corporate City Limits? (circle one)	Yes	No
or		
Has your branch office been located in the Corporate City Limits for the last 5 years?	Yes	No
Will your business be providing additional economic development opportunities created by the contract award? (e.g., hiring, or employing residents of the City of Austin or increasing tax revenue?)	Yes	No

SUBCONTRACTOR(S):

Name of Local Firm		
Physical Address		
Is your headquarters located in the Corporate City Limits? (circle one)	Yes	No
or		
Has your branch office been located in the Corporate City Limits for the last 5 years	Yes	No

Will your business be providing additional economic development opportunities created by the contract award? (e.g., hiring, or employing residents of the City of Austin or increasing tax revenue?)	Yes	No

SUBCONTRACTOR(S):

Name of Local Firm		
Physical Address		
Is your headquarters located in the Corporate City Limits? (circle one)	Yes	No
or		
Has your branch office been located in the Corporate City Limits for the last 5 years	Yes	No
Will your business be providing additional economic development opportunities created by the contract award? (e.g., hiring, or employing residents of the City of Austin or increasing tax revenue?)	Yes	No

Section 0700: Reference Sheet

Responding Company Name _____

The City at its discretion may check references in order to determine the Offeror's experience and ability to provide the products and/or services described in this Solicitation. The Offeror shall furnish at least 3 complete and verifiable references. References shall consist of customers to whom the offeror has provided the same or similar services within the last 5 years. References shall indicate a record of positive past performance.

1. Company's Name _____

   Name and Title of Contact _____

   Project Name _____

   Present Address _____

   City, State, Zip Code _____

   Telephone Number (_____)_____ Fax Number (_____)_____

   Email Address _____

2. Company's Name _____

   Name and Title of Contact _____

   Project Name _____

   Present Address _____

   City, State, Zip Code _____

   Telephone Number (_____)_____ Fax Number (_____)_____

   Email Address _____

3. Company's Name _____

   Name and Title of Contact _____

   Project Name _____

   Present Address _____

   City, State, Zip Code _____

   Telephone Number (_____)_____ Fax Number (_____)_____

   Email Address _____

City of Austin, Texas
NON-DISCRIMINATION AND NON-RETALIATION CERTIFICATION
SECTION 0800

City of Austin, Texas

Equal Employment/Fair Housing Office

To: City of Austin, Texas,

I hereby certify that our firm complies with the Code of the City of Austin, Section 5-4-2 as reiterated below, and agrees:

(1) Not to engage in any discriminatory employment practice defined in this chapter.

(2) To take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without discrimination being practiced against them as defined in this chapter, including affirmative action relative to employment, promotion, demotion or transfer, recruitment or recruitment advertising, layoff or termination, rate of pay or other forms of compensation, and selection for training or any other terms, conditions or privileges of employment.

(3) To post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Equal Employment/Fair Housing Office setting forth the provisions of this chapter.

(4) To state in all solicitations or advertisements for employees placed by or on behalf of the Contractor, that all qualified applicants will receive consideration for employment without regard to race, creed, color, religion, national origin, sexual orientation, gender identity, disability, sex or age.

(5) To obtain a written statement from any labor union or labor organization furnishing labor or service to Contractors in which said union or organization has agreed not to engage in any discriminatory employment practices as defined in this chapter and to take affirmative action to implement policies and provisions of this chapter.

(6) To cooperate fully with City and the Equal Employment/Fair Housing Office in connection with any investigation or conciliation effort of the Equal Employment/Fair Housing Office to ensure that the purpose of the provisions against discriminatory employment practices are being carried out.

(7) To require of all subcontractors having 15 or more employees who hold any subcontract providing for the expenditure of $2,000 or more in connection with any contract with the City subject to the terms of this chapter that they do not engage in any discriminatory employment practice as defined in this chapter

For the purposes of this Offer and any resulting Contract, Contractor adopts the provisions of the City's Minimum Standard Non-Discrimination and Non-Retaliation Policy set forth below.

City of Austin
Minimum Standard Non-Discrimination and Non-Retaliation in Employment Policy

As an Equal Employment Opportunity (EEO) employer, the Contractor will conduct its personnel activities in accordance with established federal, state and local EEO laws and regulations.

The Contractor will not discriminate against any applicant or employee based on race, creed, color, national origin, sex, age, religion, veteran status, gender identity, disability, or sexual orientation. This policy covers all aspects of employment, including hiring, placement, upgrading, transfer, demotion, recruitment, recruitment advertising, selection for training and apprenticeship, rates of pay or other forms of compensation, and layoff or termination.

The Contractor agrees to prohibit retaliation, discharge or otherwise discrimination against any employee or applicant for employment who has inquired about, discussed or disclosed their compensation.

Further, employees who experience discrimination, sexual harassment, or another form of harassment should immediately report it to their supervisor. If this is not a suitable avenue for addressing their compliant, employees are advised to contact another member of management or their human resources representative. No employee shall be discriminated against, harassed, intimidated, nor suffer any reprisal as a result of reporting a violation of this policy. Furthermore, any employee, supervisor, or manager who becomes aware of any such discrimination or harassment should immediately report it to executive management or the human resources office to ensure that such conduct does not continue.

Contractor agrees that to the extent of any inconsistency, omission, or conflict with its current non-discrimination and non-retaliation employment policy, the Contractor has expressly adopted the provisions of the City's Minimum Non-Discrimination Policy contained in Section 5-4-2 of the City Code and set forth above, as the Contractor's Non-Discrimination Policy or as an amendment to such Policy and such provisions are intended to not only supplement the Contractor's policy, but will also supersede the Contractor's policy to the extent of any conflict.

UPON CONTRACT AWARD, THE CONTRACTOR SHALL PROVIDE THE CITY A COPY OF THE CONTRACTOR'S NON-DISCRIMINATION AND NON-RETALIATION POLICIES ON COMPANY LETTERHEAD, WHICH CONFORMS IN FORM, SCOPE, AND CONTENT TO THE CITY'S MINIMUM NON-DISCRIMINATION AND NON-RETALIATION POLICIES, AS SET FORTH HEREIN, **OR** THIS NON-DISCRIMINATION AND NON-RETALIATION POLICY, WHICH HAS BEEN ADOPTED BY THE CONTRACTOR FOR ALL PURPOSES WILL BE CONSIDERED THE CONTRACTOR'S NON-DISCRIMINATION AND NON-RETALIATION POLICY WITHOUT THE REQUIREMENT OF A SEPARATE SUBMITTAL.

Sanctions:

Our firm understands that non-compliance with Chapter 5-4 and the City's Non-Retaliation Policy may result in sanctions, including termination of the contract and suspension or debarment from participation in future City contracts until deemed compliant with the requirements of Chapter 5-4 and the Non-Retaliation Policy.

Term:

The Contractor agrees that this Section 0800 Non-Discrimination and Non-Retaliation Certificate of the Contractor's separate conforming policy, which the Contractor has executed and filed with the City, will remain in force and effect for one year from the date of filling. The Contractor further agrees that, in consideration of the receipt of continued Contract payment, the Contractor's Non-Discrimination and Non-Retaliation Policy will automatically renew from year-to-year for the term of the underlying Contract.

Dated this _____ day of _____, _____

CONTRACTOR _____
Authorized
Signature _____

Title _____

Section 0815: Living Wages Contractor Certification

Company Name _____

Pursuant to the Living Wages provision (reference Section 0400, Supplemental Purchase Provisions) the Contractor is required to pay to all employees directly assigned to this City contract a minimum Living Wage equal to or greater than $13.50 per hour.

The below listed employees of the Contractor who are directly assigned to this contract are compensated at wage rates equal to or greater than $13.50 per hour.

Employee Name	Employee Job Title

USE ADDITIONAL PAGES AS NECESSARY

(1) All future employees assigned to this Contract will be paid a minimum Living Wage equal to or greater than $13.50 per hour.

(2) Our firm will not retaliate against any employee claiming non-compliance with the Living Wage provision.

A Contractor who violates this Living Wage provision shall pay each affected employee the amount of the deficiency for each day the violation continues. Willful or repeated violations of the provision or fraudulent statements made on this certification may result in termination of this Contract for Cause and subject the firm to possible suspension or debarment, or result in legal action.

Section 0835: Non-Resident Bidder Provisions

Company Name _____

A. Bidder must answer the following questions in accordance with Vernon's Texas Statues and Codes Annotated Government Code 2252.002, as amended:

   Is the Bidder that is making and submitting this Bid a "Resident Bidder" or a "non-resident Bidder"?

   Answer: _____

   (1) Texas Resident Bidder- A Bidder whose principle place of business is in Texas and includes a Contractor whose ultimate parent company or majority owner has its principal place of business in Texas.
   (2) Nonresident Bidder- A Bidder who is not a Texas Resident Bidder.

B. If the Bidder id a "Nonresident Bidder" does the state, in which the Nonresident Bidder's principal place of business is located, have a law requiring a Nonresident Bidder of that state to bid a certain amount or percentage under the Bid of a Resident Bidder of that state in order for the nonresident Bidder of that state to be awarded a Contract on such bid in said state?

   Answer: _____ Which State: _____

C. If the answer to Question B is "yes", then what amount or percentage must a Texas Resident Bidder bid under the bid price of a Resident Bidder of that state in order to be awarded a Contract on such bid in said state?

   Answer: _____

Section 0900: Minority- and Women-Owned Business Enterprise (MBE/WBE) Procurement Program No Goals Form

SOLICITATION NUMBER: RFP JTH0309

PROJECT NAME: Traffic Software

The City of Austin has determined that no goals are appropriate for this project. Even though goals were not assigned for this solicitation, the Bidder/Proposer is required to comply with the City's MBE/WBE Procurement Program, if areas of subcontracting are identified.

If any service is needed to perform the Contract and the Bidder/Proposer does not perform the service with its own workforce or if supplies or materials are required and the Bidder/Proposer does not have the supplies or materials in its inventory, the Bidder/Proposer shall contact the Small and Minority Business Resources Department (SMBR) at (512) 974-7600 to obtain a list of MBE and WBE firms available to perform the service or provide the supplies or materials. The Bidder/Proposer must also make a Good Faith Effort to use available MBE and WBE firms. Good Faith Efforts include but are not limited to contacting the listed MBE and WBE firms to solicit their interest in performing on the Contract, using MBE and WBE firms that have shown an interest, meet qualifications, and are competitive in the market; and documenting the results of the contacts.

Will subcontractors or sub-consultants or suppliers be used to perform portions of this Contract?

No _____ **If no, please sign the No Goals Form and submit it with your Bid/Proposal in a sealed envelope**

Yes _____ **If yes, please contact SMBR to obtain further instructions and an availability list and perform Good Faith Efforts. Complete and submit the No Goals Form and the No Goals Utilization Plan with your Bid/Proposal in a sealed envelope.**

After Contract award, if your firm subcontracts any portion of the Contract, it is a requirement to complete Good Faith Efforts and the No Goals Utilization Plan, listing any subcontractor, sub-consultant, or supplier. Return the completed Plan to the Project Manager or the Contract Manager.

I understand that even though goals were not assigned, I must comply with the City's MBE/WBE Procurement Program if subcontracting areas are identified. I agree that this No Goals Form and No Goals Utilization Plan shall become a part of my Contract with the City of Austin.

Company Name
Name and Title of Authorized Representative (Print or Type)
Signature **Date**

Minority- and Women-Owned Business Enterprise (MBE/WBE) Procurement Program No Goals Utilization Plan *(Please duplicate as needed)*

SOLICITATION NUMBER: RFP JTH0309
PROJECT NAME: TRAFFIC FIRMWARE

PRIME CONTRACTOR / CONSULTANT COMPANY INFORMATION

Name of Contractor/Consultant			
Address			
City, State Zip			
Phone Number		Fax Number	
Name of Contact Person			
Is Company City certified?	Yes ☐ No ☐ MBE ☐ WBE ☐ MBE/WBE Joint Venture ☐		

I certify that the information included in this No Goals Utilization Plan is true and complete to the best of my knowledge and belief. I further understand and agree that the information in this document shall become part of my Contract with the City of Austin.

Name and Title of Authorized Representative (Print or Type)

Signature **Date**

Provide a list of all proposed subcontractors / sub-consultants / suppliers that will be used in the performance of this Contract. **Attach Good Faith Effort documentation if non MBE/WBE firms will be used.**

Sub-Contractor / Sub-Consultant			
City of Austin Certified	MBE ☐ WBE ☐ Ethics / Gender Code: ☐ Non-Certified		
Vendor ID Code			
Contact Person		Phone Number	
Amount of Subcontract	$		
List commodity codes & description of services			

Sub-Contractor / Sub-Consultant			
City of Austin Certified	MBE ☐ WBE ☐ Ethics / Gender Code: ☐ Non-Certified		
Vendor ID Code			
Contact Person		Phone Number	
Amount of Subcontract	$		
List commodity codes & description of services			

FOR SMALL AND MINORITY BUSINESS RESOURCES DEPARTMENT USE ONLY:

Having reviewed this plan, I acknowledge that the proposer (HAS) or (HAS NOT) complied with City Code Chapter 2-9A/B/C/D, as amended.

Reviewing Counselor _____ **Date** _____ **Director/Deputy Director** _____ **Date** _____

CITY OF AUSTIN
PURCHASING OFFICE
PURCHASING EXCEPTIONS
SECTION 301

Solicitation Number: RFP JTH0309

The offeror shall clearly indicate each exception taken, provide alternative language, and justify the alternative language. The offeror that is awarded the contract will be required to sign the contract with the provisions accepted; any exceptions may be negotiated or may result in the City deeming the offer non-responsive. Failure to accept or provide the exception information below may result in the City deeming the offer non-responsive.

1. **0300 STANDARD PURCHASE TERMS & CONDITIONS**

☐ Accepted as written. ☐ Not accepted as written. See below:

Indicate:
Page Number **Section Number** **Section Description**

Alternate Language:

Justification:

NOTE: Copies of this form may be utilized if additional pages are needed.

CITY OF AUSTIN
PURCHASING OFFICE
PURCHASING EXCEPTIONS
SECTION 301

Solicitation Number: RFP JTH0309

The offeror shall clearly indicate each exception taken, provide alternative language, and justify the alternative language. The offeror that is awarded the contract will be required to sign the contract with the terms and conditions accepted; any exceptions may be negotiated or may result in the City deeming the offer non-responsive. Failure to accept or provide the exception information below may result in the City deeming the offer non-responsive.

2. **0400 SUPPLEMENTAL PURHCASE PROVISIONS**

☐ Accepted as written. ☐ Not accepted as written. See below:

Indicate:
Page Number **Section Number** **Section Description**

Alternate Language:

Justification:

NOTE: Copies of this form may be utilized if additional pages are needed.

CITY OF AUSTIN
PURCHASING OFFICE
PURCHASING EXCEPTIONS
SECTION 301

Solicitation Number: RFP JTH0309

The offeror shall clearly indicate each exception taken, provide alternative language, and justify the alternative language. The offeror that is awarded the contract will be required to sign the contract with the terms and conditions accepted; any exceptions may be negotiated or may result in the City deeming the offer non-responsive. Failure to accept or provide the exception information below may result in the City deeming the offer non-responsive.

Place t

3. **0500 SCOPE OF WORK**

☐ Accepted as written. ☐ Not accepted as written. See below:

Indicate:
Page Number **Section Number** **Section Description**

Alternate Language:

Justification:

NOTE: Copies of this form may be utilized if additional pages are needed.

CITY OF AUSTIN
PURCHASING OFFICE
SUPPLEMENTAL PURCHASE PROVISIONS
SECTION 0400

The following Supplemental Purchasing Provisions apply to this solicitation:

1. **EXPLANATIONS OR CLARIFICATIONS:** (reference paragraph 5 in Section 0200)

   All requests for explanations or clarifications must be submitted in writing to the Purchasing Office by email to Jim.Howard@austintexas.gov no later than 5:00 PM CST on February 2, 2017.

2. **INSURANCE:** Insurance is required for this solicitation.

   A. **General Requirements:** See Section 0300, Standard Purchase Terms and Conditions, paragraph 32, entitled Insurance, for general insurance requirements.

      i. The Contractor shall provide a Certificate of Insurance as verification of coverages required below to the City at the below address prior to contract execution and within 14 calendar days after written request from the City. Failure to provide the required Certificate of Insurance may subject the Offer to disqualification from consideration for award
      ii. The Contractor shall not commence work until the required insurance is obtained and until such insurance has been reviewed by the City. Approval of insurance by the City shall not relieve or decrease the liability of the Contractor hereunder and shall not be construed to be a limitation of liability on the part of the Contractor.
      iii. The Contractor must also forward a Certificate of Insurance to the City whenever a previously identified policy period has expired, or an extension option or holdover period is exercised, as verification of continuing coverage.
      iv. The Certificate of Insurance, and updates, shall be mailed to the following address:

         City of Austin Purchasing Office
         P. O. Box 1088
         Austin, Texas 78767

   B. **Specific Coverage Requirements:** The Contractor shall at a minimum carry insurance in the types and amounts indicated below for the duration of the Contract, including extension options and hold over periods, and during any warranty period. These insurance coverages are required minimums and are not intended to limit the responsibility or liability of the Contractor.

      i. **Worker's Compensation and Employers' Liability Insurance:** Coverage shall be consistent with statutory benefits outlined in the Texas Worker's Compensation Act (Section 401). The minimum policy limits for Employer's Liability are $100,000 bodily injury each accident, $500,000 bodily injury by disease policy limit and $100,000 bodily injury by disease each employee.
         (1) The Contractor's policy shall apply to the State of Texas and include these endorsements in favor of the City of Austin:
            (a) Waiver of Subrogation, Form WC420304, or equivalent coverage
            (b) Thirty (30) days Notice of Cancellation, Form WC420601, or equivalent coverage
      ii. **Commercial General Liability Insurance:** The minimum bodily injury and property damage per occurrence are $500,000 for coverages A (Bodily Injury and Property Damage) and B (Personal and Advertising Injury).
         (1) The policy shall contain the following provisions:
            (a) Contractual liability coverage for liability assumed under the Contract and all other Contracts related to the project.
            (b) Contractor/Subcontracted Work.
            (c) Products/Completed Operations Liability for the duration of the warranty period.
            (d) If the project involves digging or drilling provisions must be included that provide Explosion, Collapse, and/or Underground Coverage.
         (2) The policy shall also include these endorsements in favor of the City of Austin:
            (a) Waiver of Subrogation, Endorsement CG 2404, or equivalent coverage

(b) Thirty (30) days Notice of Cancellation, Endorsement CG 0205, or equivalent coverage
(c) The City of Austin listed as an additional insured, Endorsement CG 2010, or equivalent coverage

iii. **Business Automobile Liability Insurance:** The Contractor shall provide coverage for all owned, non-owned and hired vehicles with a minimum combined single limit of $500,000 per occurrence for bodily injury and property damage. Alternate acceptable limits are $250,000 bodily injury per person, $500,000 bodily injury per occurrence and at least $100,000 property damage liability per accident.

(1) The policy shall include these endorsements in favor of the City of Austin:
(a) Waiver of Subrogation, Endorsement CA0444, or equivalent coverage
(b) Thirty (30) days Notice of Cancellation, Endorsement CA0244, or equivalent coverage
(c) The City of Austin listed as an additional insured, Endorsement CA2048, or equivalent coverage.

v. **Professional Liability/Technology Errors and Omissions Insurance**: The Contractor shall provide coverage, at a minimum limit of $5,000,000 per claim, to pay on behalf of the assured all sums which the assured shall become legally obligated to pay as damages by reason of any negligent act, error, omission, or breach of security (including but not limited to any confidential or private information) arising out of the performance of professional services under this Agreement. The required coverage shall extend to technology licensed and/or purchased, including any Software licensed or Hardware purchased under this Contract.

If coverage is written on a claims-made basis, the retroactive date shall be prior to or coincident with the date of the Contract and the certificate of insurance shall state that the coverage is claims-made and indicate the retroactive date. This coverage shall be continuous and will be provided for 24 months following the completion of the contract.

vi. **Cyber Liability Insurance**: coverage of not less than $2,000,000 each claim and $4,000,000 annual aggregate providing coverage for damages and claims expenses, including notification expenses, arising from (1) breach of network security, (2) alteration, corruption, destruction or deletion of information stored or processed on a computer system, (3)invasion of privacy, including identity theft and unauthorized transmission or publication of personal information, (4) unauthorized access and use of computer systems, including hackers (5) the transmission of malicious code, and (6) website content, including claims of libel, slander, trade libel, defamation, infringement of copyright, trademark and trade dress and invasion of privacy.

Policy shall be endorsed to name City of Austin, its Affiliates, and their respective directors, officers, employees, and agents, as additional insureds.

C. **Endorsements:** The specific insurance coverage endorsements specified above, or their equivalents must be provided. In the event that endorsements, which are the equivalent of the required coverage, are proposed to be substituted for the required coverage, copies of the equivalent endorsements must be provided for the City's review and approval.

3. **TERM OF CONTRACT:**

A. The Contract shall be in effect for an initial term of 60 months and may be extended thereafter for up to 2 additional 12 month periods, subject to the approval of the Contractor and the City Purchasing Officer or his designee.

B. Upon expiration of the initial term or period of extension, the Contractor agrees to hold over under the terms and conditions of this agreement for such a period of time as is reasonably necessary to re-solicit and/or complete the project (not to exceed 120 days unless mutually agreed on in writing).

C. Upon written notice to the Contractor from the City's Purchasing Officer or his designee and acceptance of the Contractor, the term of this contract shall be extended on the same terms and conditions for an additional period as indicated in paragraph A above.

D. Prices are firm and fixed for the first twelve months. Thereafter, price changes are subject to the Economic Price Adjustment provisions of this Contract.

4. **QUANTITIES:** The quantities listed herein are estimates for the period of the Contract. The City reserves the right to purchase more or less of these quantities as may be required during the Contract term. Quantities will be as needed and specified by the City for each order. Unless specified in the solicitation, there are no minimum order quantities.

5. **INVOICES and PAYMENT:** (reference paragraphs 12 and 13 in Section 0300)

A. Invoices shall contain a unique invoice number and the information required in Section 0300, paragraph 12, entitled "Invoices." Invoices received without all required information cannot be processed and will be returned to the vendor.

Invoices shall be mailed to the below address:

	City of Austin
Department	CTM AP INVOICES
Attn:	CTMAP@austintexas.gov

B. The Contractor agrees to accept payment by either credit card, check or Electronic Funds Transfer (EFT) for all goods and/or services provided under the Contract. The Contractor shall factor the cost of processing credit card payments into the Offer. There shall be no additional charges, surcharges, or penalties to the City for payments made by credit card.

6. **HAZARDOUS MATERIALS:**

A. If this Solicitation involves hazardous materials, the Offeror shall furnish with the Offer Material Safety Data Sheets (MSDS), (OSHA Form 20), on all chemicals and hazardous materials specifying the generic and trade name of product, product specification, and full hazard information including receiving and storage hazards. Instructions, special equipment needed for handling, information on approved containers, and instructions for the disposal of the material are also required.

B. Failure to submit the MSDS as part of the Offer may subject the Offer to disqualification from consideration for award.

C. The MSDS, instructions and information required in paragraph "A" must be included with each shipment under the contract.

7. **LIVING WAGES:**

A. The minimum wage required for any Contractor employee directly assigned to this City Contract is $13.50 per hour, unless Published Wage Rates are included in this solicitation. In addition, the City may stipulate higher wage rates in certain solicitations in order to assure quality and continuity of service.

B. The City requires Contractors submitting Offers on this Contract to provide a certification **(see the Living Wages Contractor Certification included in the Solicitation**) with their Offer certifying that all employees directly assigned to this City Contract will be paid a minimum living wage equal to or greater than $13.50 per hour. The certification shall include a list of all employees directly assigned to providing services under the resultant contract including their name and job title. The list shall be updated and provided to the City as necessary throughout the term of the Contract.

C. The Contractor shall maintain throughout the term of the resultant contract basic employment and wage information for each employee as required by the Fair Labor Standards Act (FLSA).

D. The Contractor shall provide to the Department's Contract Manager with the first invoice, individual Employee Certifications for all employees directly assigned to the contract. The City reserves the right to request individual Employee Certifications at any time during the contract term. Employee Certifications shall be signed by each employee directly assigned to the contract. The Employee Certification form is available on-line at https://www.austintexas.gov/financeonline/vendor_connection/index.cfm.

E. Contractor shall submit employee certifications annually on the anniversary date of contract award with the respective invoice to verify that employees are paid the Living Wage throughout the term of the contract. The Employee Certification Forms shall be submitted for employees added to the contract and/or to report any employee changes as they occur.

F. The Department's Contract Manager will periodically review the employee data submitted by the Contractor to verify compliance with this Living Wage provision. The City retains the right to review employee records required in paragraph C above to verify compliance with this provision.

8. **NON-COLLUSION, NON-CONFLICT OF INTEREST, AND ANTI-LOBBYING:**

A. On November 10, 2011, the Austin City Council adopted Ordinance No. 20111110-052 amending Chapter 2.7, Article 6 of the City Code relating to Anti-Lobbying and Procurement. The policy defined in this Code applies to Solicitations for goods and/or services requiring City Council approval under City Charter Article VII, Section 15 (Purchase Procedures). During the No-Contact Period, Offerors or potential Offerors are prohibited from making a representation to anyone other than the Authorized Contact Person in the Solicitation as the contact for questions and comments regarding the Solicitation.

B. If during the No-Contact Period an Offeror makes a representation to anyone other than the Authorized Contact Person for the Solicitation, the Offeror's Offer is disqualified from further consideration except as permitted in the Ordinance.

C. If an Offeror has been disqualified under this article more than two times in a sixty (60) month period, the Purchasing Officer shall debar the Offeror from doing business with the City for a period not to exceed three (3) years, provided the Offeror is given written notice and a hearing in advance of the debarment.

D. The City requires Offerors submitting Offers on this Solicitation to certify that the Offeror has not in any way directly or indirectly made representations to anyone other than the Authorized Contact

Person during the No-Contact Period as defined in the Ordinance. The text of the City Ordinance is posted on the Internet at: http://www.ci.austin.tx.us/edims/document.cfm?id=161145

9. **NON-SOLICITATION:**

A. During the term of the Contract, and for a period of six (6) months following termination of the Contract, the Contractor, its affiliate, or its agent shall not hire, employ, or solicit for employment or consulting services, a City employee employed in a technical job classification in a City department that engages or uses the services of a Contractor employee.

B. In the event that a breach of Paragraph A occurs the Contractor shall pay liquidated damages to the City in an amount equal to the greater of: (i) one (1) year of the employee's annual compensation; or (ii) 100 percent of the employee's annual compensation while employed by the City. The Contractor shall reimburse the City for any fees and expenses incurred in the enforcement of this provision.

C. During the term of the Contract, and for a period of six (6) months following termination of the Contract, a department that engages the services of the Contractor or uses the services of a Contractor employee will not hire a Contractor employee while the employee is performing work under a Contract with the City unless the City first obtains the Contractor's approval.

D. In the event that a breach of Paragraph C occurs, the City shall pay liquidated damages to the Contractor in an amount equal to the greater of: (i) one (1) year of the employee's annual compensation or (ii) 100 percent of the employee's annual compensation while employed by the Contractor.

10. **WORKFORCE SECURITY CLEARANCE AND IDENTIFICATION (ID):**

A. Contractors are required to obtain a certified criminal background report with fingerprinting (referred to as the "report") for all persons performing on the contract, including all Contractor, Subcontractor, and Supplier personnel (for convenience referred to as "Contractor's personnel").

B. The report may be obtained by reporting to one of the below governmental entities, submitting to fingerprinting and requesting the report [requestors may anticipate a two-week delay for State reports and up to a four to six-week delay for receipt of a Federal report.].

i. Texas Department of Public Safety for any person currently residing in the State of Texas and having a valid Texas driver's license or photo ID card;
ii. The appropriate governmental agency from either the U.S. state or foreign nation in which the person resides and holds either a valid U.S. state-issued or foreign national driver's license or photo ID card; or
iii. A Federal Agency. A current Federal security clearance obtained from and certified by a Federal agency may be substituted.

C. Contractor shall obtain the reports at least 30 days prior to any onsite work commencement. Contractor also shall attach to each report the project name, Contractor's personnel name(s), current address(es), and a copy of the U.S. state-issued or foreign national driver's license or photo ID card.

D. Contractor shall provide the City a Certified Criminal Background Report affirming that Contractor has conducted required security screening of Contractor's personnel to determine those appropriate for execution of the work and for presence on the City's property. A list of all Contractor Personnel requiring access to the City's site shall be attached to the affidavit.

E. Upon receipt by the City of Contractor's affidavit described in (D) above and the list of the Contractor's personnel, the City will provide each of Contractor's personnel a contractor ID badge that is required

for access to City property that shall be worn at all times by Contractor's personnel during the execution of the work.

F. The City reserves the right to deny an ID badge to any Contractor personnel for reasonable cause, including failure of a Criminal History background check. The City will notify the Contractor of any such denial no more than twenty (20) days after receipt of the Contractor's reports. Where denial of access by a particular person may cause the Contractor to be unable to perform any portion of the work of the contract, the Contractor shall so notify the City's Contract Manager, in writing, within ten (10) calendar days of the receipt of notification of denial.

G. Contractor's personnel will be required to wear the ID badge at all times while on the work site. Failure to wear or produce the ID badge may be cause for removal of an individual from the work site, without regard to Contractor's schedule. Lost ID badges shall be reported to the City's Contract Manager. Contractor shall reimburse the City for all costs incurred in providing additional ID badges to Contractor Personnel.

H. ID badges to enter and/or work on the City property may be revoked by the City at any time. ID badges must be returned to the City at the time of project completion and acceptance or upon removal of an individual from the work site.

I. Contractor is not required to obtain reports for delivery personnel, including but not limited to FedEx, UPS, Roadway, or other materials delivery persons, however all delivery personnel must present company/employer-issued photo ID and be accompanied by at least one of Contractor's personnel at all times while at the work site.

J. The Contractor shall retain the reports and make them available for audit by the City during regular business hours (reference paragraph 17 in Section 0300, entitled Right to Audit).

11. **INTERLOCAL PURCHASING AGREEMENTS:** (applicable to competitively procured goods/services contracts).

A. The City has entered into Interlocal Purchasing Agreements with other governmental entities, pursuant to the Interlocal Cooperation Act, Chapter 791 of the Texas Government Code. The Contractor agrees to offer the same prices and terms and conditions to other eligible governmental agencies that have an interlocal agreement with the City.

B. The City does not accept any responsibility or liability for the purchases by other governmental agencies through an interlocal cooperative agreement.

12. **WARRANTY:** The warranty period, as described in this section, will include the initial warranty period plus any extensions of the warranty through the execution or renewal of a maintenance and service contract.

The Contractor shall warranty the software for fitness of purpose and against all defects (bugs) for a period of thirty-six (36) months (initial warranty period) following final acceptance of the Software by the City.

The City may extend the initial warranty period if, in the opinion of the City, the identified defect causes delays to the City's field implementation. The extension of the initial warranty period shall be equal to the number of days that the City's implementation plan is delayed.

In the event that the City identifies defects in the software during the warranty period, the Contractor shall provide, in writing and within 10 working days, a proposed solution and schedule for fixing the defect.

The Contractor shall maintain a formal problem reporting, tracking, and resolution system during the warranty period. The system, at a minimum, shall provide the following:

- Problem reporting process (i.e. telephone, email, web based direct entry)
- Specific description of problem, proposed and actual schedule of correcting problem, proposed solution
- Accessibility by the City to view all outstanding issues associated with the software regardless of identifying Agency.

The Contractor shall make take all appropriate actions to resolve the problem as quickly as possible.

The Contractor shall provide monthly written status reports on the resolution of all defects.

During the initial warranty period only, the City shall be entitled to a full refund of the cost of the software if the software fails to comply with the requirements of this Contract and the Contractor is unable to rectify the problem to the satisfaction of the City.

The Contractor shall maintain the software throughout the warranty period. Software maintenance shall include, but not be limited to the following:

- Provide the City with maintenance updates as required.
- Maintain/upgrade the software so that it remains relevant to traffic industry needs, processes, and standards.
- Implement changes requested by the City. Changes requested by the City and implemented will be charged separately.

The Contractor shall provide support to the City during the warranty period to achieve the following:

- Maximize the use of the software.
- Assist in troubleshooting or configuration problems.
- Provide additional training.
- Updated Documentation

Software support shall include the following:

- Access to a technical knowledge base including, but not limited to, special user groups, software user's newsletters, advanced documentation, and software developers.
- On-site support
- Helpdesk

The Contractor shall provide software upgrades to the City during the warranty period.

The Contractor shall provide support to the City for the integration of the Local controller software MIB into the KITS Central Management System.

13. **SOFTWARE LICENSE:** The City shall receive a non-exclusive, non-transferable, perpetual and irrevocable license, which grants the City the right to use and copy the selected local controller software, within the limits of the software license agreement set forth and agreed to between the City and Contractor, and consistent with the Price Form as noted below. Such license shall grant the City the right to use the software, for the purpose of traffic signal control within the corporate limits of the City or other locations that will be operated and maintained by the City which may be established for the purpose of traffic signal control.

    The software license shall be granted in blocks of a specified number of intersections, as mutually agreed to between both parties up until the threshold has been met whereby the City will receive a Site license.

    The Contractor shall not place any limitations on the re-distribution and re-use of the current management information base (MIB) and enhancements via future upgrades of the controller software with their current provider of the central traffic management system KITS for a period of 10 years from initial contract with the

Contractor. The City shall be able to re-distribute and/or re-use the MIBs as required to exercise the defined functionality defined in the requirements matrix.

14. **SOFTWARE TERMS:**

A. In the event of termination of the contract, the Contractor shall implement an orderly return of City data in a CSV or another mutually agreeable format at a time agreed to by the parties and the subsequent secure disposal of City data.

B. During any period of service suspension, the Contractor shall not take any action to intentionally erase any City data.

C. In the event of termination of any services or agreement in its entirety, the Contractor shall not take any action to intentionally erase any City data for a period of:

- 10 days after the effective date of termination, if the termination is in accordance with the contract period
- 30 days after the effective date of termination, if the termination is for convenience
- 60 days after the effective date of termination, if the termination is for cause. After such period, the Contractor shall have no obligation to maintain or provide any City data and shall thereafter, unless legally prohibited, delete all City data in its systems or otherwise in its possession or under its control.

D. The City shall be entitled to any post-termination assistance generally made available with respect to the services unless a unique data retrieval arrangement has been established as part of the contract

The Contractor shall securely dispose of all requested data in all of its forms, such as disk, CD/DVD, backup tape and paper, when requested by the City. Data shall be permanently deleted and shall not be recoverable, according to National Institute of Standards and Technology (NIST)- approved methods. Certificates of destruction shall be provided to the City.

E. Data Location: The Contractor shall provide its services to the City and its end users solely from data centers in the U.S. Storage of City data at rest shall be located solely in data centers in the U.S. The Contractor shall not allow its personnel or contractors to store City data on portable devices, including personal computers, except for devices that are used and kept only at its U.S. data centers. The Contractor shall permit its personnel and contractors to access City data remotely only as required to provide technical support. The Contractor may provide technical user support only on a 24/7 basis using a Follow the Sun model, unless otherwise prohibited in this contract.

F. Import and Export of Data**:** The City shall have the ability to import or export data in piecemeal or in entirety at its discretion without interference from the Contractor. This includes the ability for the City to import or export data to/from other Contractors.

G. Data Ownership: The City will own all right, title and interest in its data that is related to the services provided by this contract. The Contractor shall not access City user accounts or City data, except

(1) in the course of data center operations, (2) in response to service or technical issues, (3) as required by the express terms of this contract, or (4) at the City's written request.

H. Data Protection: Protection of personal privacy and data shall be an integral part of the business activities of the Contractor to ensure there is no inappropriate or unauthorized use of City information at any time. To this end, the Contractor shall safeguard the confidentiality, integrity and availability of City information and comply with the following conditions:

1 The Contractor shall implement and maintain appropriate administrative, technical and organizational security measures to safeguard against unauthorized access, disclosure or theft of personal data and non-public data. Such security measures shall be in accordance with recognized industry practice and not less stringent than the measures the Contractor applies to its own personal data and non-public data of similar kind.

2. All data obtained by the Contractor in the performance of this contract shall become and remain property of the City.

3. All personal data shall be encrypted at rest and in transit with controlled access. Unless otherwise stipulated, the Contractor is responsible for encryption of the personal data. Any stipulation of responsibilities will identify specific roles and responsibilities and shall be included in the contract.

4. Unless otherwise stipulated, the Contractor shall encrypt all non-public data at rest and in transit. The City shall identify data it deems as non-public data to the Contractor. The level of protection and encryption for all non-public data shall be identified and made a part of this contract.

5. At no time shall any data or processes – that either belong to or are intended for the use of a City or its officers, agents or employees – be copied, disclosed or retained by the Contractor or any party related to the Contractor for subsequent use in any transaction that does not include the City.

6. The Contractor shall not use any information collected in connection with the service issued from this proposal for any purpose other than fulfilling the service.

I. Compliance with Accessibility Standards: The Contractor shall comply with and adhere to Accessibility Standards of Section 508 Amendment to the Rehabilitation Act of 1973.

J. Security: The Contractor shall disclose its non-proprietary security processes and technical limitations to the City such that adequate protection and flexibility can be attained between the City and the Contractor. For example: virus checking and port sniffing – the City and the Contractor shall understand each other's roles and responsibilities.

K. Security in Compliance with Chapter 521 of the Texas Business and Commerce Code: Contractor shall comply with all requirements under Chapter 521 of the Texas Business and Commerce Code, including but not limited to being responsible for a program that protects against the unlawful use or disclosure of personal information collected or maintained in the regular course of business. The program shall include policies and procedures for the implementation of administrative, technical, and physical safeguards, and shall also address appropriate corrective action for events of any security breach and proper methods of destroying records containing sensitive personal information.

L. Security Incident or Data Breach Notification: The Contractor shall inform the City of any security incident or data breach.

M. Incident Response: The Contractor may need to communicate with outside parties regarding a security incident, which may include contacting law enforcement, fielding media inquiries and seeking external expertise as mutually agreed upon, defined by law or contained in the contract. The Contractor must obtain authorization from the City prior to communicating security incidents. Discussing security incidents with the City should be handled on an urgent as-needed basis, as part of Contractor communication and mitigation processes as mutually agreed upon, defined by law or contained in the contract.

N. Security Incident Reporting Requirements: The Contractor shall report a security incident to the appropriate City identified contact immediately.

O. Breach Reporting Requirements: If the Contractor has actual knowledge of a confirmed data breach that affects the security of any City content that is subject to applicable data breach notification law, the Contractor shall (1) promptly notify the appropriate City identified contact

within 24 hours or sooner, unless shorter time is required by applicable law, and (2) take commercially reasonable measures to address the data breach in a timely manner.

P. Breach Responsibilities: This section only applies when a data breach occurs with respect to personal data within the possession of control of Contractor.

Q. The Contractor, unless stipulated otherwise, shall immediately notify the appropriate City identified contact by telephone in accordance with the agreed upon security plan or security procedures if it reasonably believes there has been a security incident.

R. The Contractor, unless stipulated otherwise, shall promptly notify the appropriate City identified contact within 24 hours or sooner by telephone, unless shorter time is required by applicable law, if it confirms that there is, or reasonably believes that there has been a data breach. The Contractor shall:

(1) cooperate with the City as reasonably requested by the City to investigate and resolve the data breach,

(2) promptly implement necessary remedial measures, if necessary, and

(3) document responsive action taken related to the data breach, including any post-incident review of events and actions taken to make changes in business practices in providing the services, if necessary.

S. Unless otherwise stipulated, if a data breach is direct result of the Contractor's breach of its contract obligation to encrypt personal data or otherwise prevent its release, the Contractor shall bear the costs associated with (1) the investigation and resolution of the data breach; (2) notifications to individuals, regulators or others required by state law; (3) a credit monitoring service required by state (or federal) law; (4) establishing a website or a toll-free number and call center for affected individuals required by state law – all not to exceed the average per record per person cost calculated for data breaches in the United States (currently $201 per record/person) in the most recent Cost of Data Breach Study: Global Analysis published by the Ponemon Institute at the time of the data breach; and (5) complete all corrective actions as reasonably determined by Contractor based on root cause.

T. Responsibilities and Uptime Guarantee: The Contractor shall be responsible for the acquisition and operation of all hardware, software and network support related to the services being provided. The technical and professional activities required for establishing, managing, and maintaining the environments are the responsibilities of the Contractor. The system shall be available 24/7/365 (with agreed-upon maintenance downtime), and provide service to customers as defined in the Service Level Agreement..

15. **Web Services**: The Contractor shall use Web services exclusively to interface with the City's data in near real time when possible.

16. **Encryption of Data at Rest**: The Contractor shall ensure hard drive encryption consistent with validated cryptography standards as referenced in FIPS 140-2, Security Requirements for Cryptographic Modules for all personal data, unless the City approves the storage of personal data on a Contractor portable device in order to accomplish work as defined in the statement of work.

17. **Ownership**:

1. Patents: As to any patentable subject matter contained in the Deliverables, the Contractor agrees to disclose such patentable subject matter to the City. Further, if requested by the City, the Contractor agrees to assign and, if necessary, cause each of its employees to assign the entire right, title, and interest to specific inventions under such patentable subject matter to the City and to execute, acknowledge, and deliver and, if necessary, cause each of its employees to execute,

acknowledge, and deliver an assignment of letters patent, in a form to be reasonably approved by the City, to the City upon request by the City.

2. **Copyrights:** As to any Deliverable containing copyrighted subject matter, the Contractor agrees that upon their creation, such Deliverables shall be considered as work made-for-hire by the Contractor for the City and the City shall own all copyrights in and to such Deliverables, provided however, that nothing in this Paragraph shall negate the City's sole or joint ownership of any such Deliverables arising by virtue of the City's sole or joint authorship of such Deliverables. Should by operation of law, such Deliverables not be considered work made-for-hire, the Contractor hereby assigns to the City (and agrees to cause each of its employees providing services to the City hereunder to execute, acknowledge, and deliver an assignment to the City of Austin) all worldwide right, title, and interest in and to such Deliverables. With respect to such work made-for-hire, the Contractor agrees to execute, acknowledge and deliver and cause each of its employees providing services to the City hereunder to execute, acknowledge, and deliver a work-for-hire agreement, in a form to be reasonably approved by the City, to the City upon delivery of such Deliverables to the City or at such other time as the City may request.

3. **Additional Assignments:** The Contractor further agrees to, and if applicable, cause each of its employees to execute, acknowledge, and deliver all applications, specifications, oaths, assignments, and all other instruments which the City might reasonably deem necessary in order to apply for and obtain copyright protection, mask work registration, trademark registration and/or protection, letters patent, or any similar rights in any and all countries and in order to assign and convey to the City, its successors, assigns, and nominees, the sole and exclusive right, title, and interest in and to the Deliverables, The Contractor's obligations to execute acknowledge, and deliver (or cause to be executed, acknowledged, and delivered) instruments or papers shall continue after the termination of this Contract with respect to such Deliverables. In the event the City should not seek to obtain copyright protection, mask work registration or patent protection for any of the Deliverables, but should arise to keep the same secret, the Contractor agrees to treat the same as Confidential Information under the terms of Paragraph above.

18. **CONTRACT MANAGER:** The following person is designated as Contract Manager, and will act as the contact point between the City and the Contractor during the term of the Contract:

Anthony Hall 512-974-4005

Anthony.hall@austintexas.gov

*Note: The above listed Contract Manager is not the authorized Contact Person for purposes of the **NON-COLLUSION, NON-CONFLICT OF INTEREST, AND ANTI-LOBBYING Provision** of this Section; and therefore, contact with the Contract Manager is prohibited during the no contact period.

CITY OF AUSTIN
PURCHASING OFFICE
SCOPE OF WORK
RFP JTH0309
SECTION 0500

1 PURPOSE

1.1 Purpose of Request for Proposal

The City of Austin (City) seeks to establish a multi-jurisdictional Contract to purchase specialized software used to manage traffic operations at signalized intersections and control of pedestrian hybrid beacons.

The City will be the primary procurement entity for the Contract and will make the resultant Contract from this solicitation available to interested public entities including the City of San Antonio who has collaborated with the City of Austin in developing this Scope of Work and requirements and will be involved in the selection process for this Contractor. The City will manage the Contract and will have sole ability to alter or amend the Contract. Interested Parties will have the ability to utilize the services and pricing from the resultant Contract through the establishment of negotiated contract agreements made directly with awarded Contractor(s), and may require modification of terms and conditions to meet the respective entity's ordinances, rules and regulations.

All Contract transactions will occur directly between the Contractor(s) and each public entity (the City or Interested Parties) individually, and neither the City nor any Interested Party shall be liable for any acts, liabilities, damages, etc. incurred by any other entity.

2 DESCRIPTION OF EXISTING SYSTEM(S)

2.1 Current System – City of Austin

The City of Austin has 974 signalized intersections and 50 Pedestrian Hybrid Beacons (PHBs) that utilize the Siemens NextPhase (Version 1.7.6) for operations.

The City has 1027 Model 2070 controllers configured typically to include:

2070	Unit Chassis,
2070-1B/1E	CPU Module (single board/light version) with Ethernet port, and 8 megabyte flash memory
2070-2A	Field I/O Module (FI/O For 170 Cabinets),
2070-3B	Front Panel Module, 8x40 character display with keyboard,
2070-4A	Power Supply Module, 10 Amp,

Communications between the Advanced Traffic Management System (ATMS) software and signal controllers is all Ethernet. The majority of communication is utilizing fiber optic cable. The City has approximately 10 wireless radios utilizing the 5.8 GHz frequency to a portion of the connected signals. The City does not currently have full communication to all 1027 intersections as some remain in remote locations.

The City deployed the Kimley-Horn KITS software in 2010. The Kimley-Horn KITS software is fully operational and has 778 intersections under Kimley-Horn KITS control.

The City currently uses a central based transit signal priority system in which Special Functions are commanded to the controller running the NextPhase software to trigger exclusive phases that serves as an extended green (fixed 6 seconds) as part of CapMetro's (CMTA) METRO*Rapid* program. The bus fleet transmits location (AVL) to their central dispatch system (ACS Xerox) which identifies schedule adherence and subsequently makes the

determination to request a priority phase time extension. Essentially, if the bus is behind schedule, a request is made using a secure center-to-center channel to the Kimley-Horn KITS software. This operation is currently operational on approximately 38 miles of arterial roadway in mixed flow lanes. As an expansion of this program, the City is investigating the provision of a variable green extension time based on a bus' passenger count. The Contractor will be requested to provide an explanation to how their software will support the current operation and possible future (expanded) operation.

Further, the City of Austin intends to covert its Emergency Vehicle Preempt system from an optical-based system to a system similar to the central-based system used for Transit Signal Priority. The Contractor will be requested to provide a description as to how their proposed software can be used in such a system.

2.2 Current System – City of San Antonio

The City of San Antonio has 1371 signalized intersections and 26 lane control signals that utilize the Siemens NextPhase (version 1.7.7) for operations.

The City has over 1400 Model 2070 controllers. In 2008, the majority of controller hardware was purchased and met the following requirements:

- The Model 2070L controller complies with the Transportation Electrical Equipment Specifications (TEES), dated 2002, including Errata 1 (2003) and Errata 2 (2004). The Model 2070L controllers were delivered with the following options:
  - 2070-1B Central Processing Unit (CPU) module.
  - 2070-2A Field Input/Output (I/O) module (C1 and C11 connectors).
  - 2070-3B front panel (8 line display).
  - 2070-4B (3.5 Amp) power supply.

The City's communications network consists of fiber optic cable and wireless.

The City deployed the Kimley-Horn KITS software in 2015 and it is fully operational. The Kimley-Horn KITS software has 1409 signalized intersections (includes test cabinets) under control.

Similar to the City of Austin, the City of San Antonio has implemented transit signal priority on several corridors. Much of the operation in concept is similar between the two cities. The primary difference is that in San Antonio they are leveraging the Prioritor function within NextPhase version 1.7.7. The Contractor shall provide the same operation, or better operation than described above.

3 PROJECT SCOPE

3.1 Background

The City of Austin has been using Siemens NextPhase since 1999, at which time they also began using the Model 2070 controller, at approximately 750 signalized intersections. The Siemens NextPhase controller software is considered to be "end of life." The controller hardware will be upgraded as needed and will continue to be used until it has reached the end of its useful life. The City of Austin uses the Kimley-Horn software KITS to manage their signalized intersections.

The City of San Antonio has been using Siemens NextPhase since 2008, at which time they also began using the Model 2070 controller. They have approximately 1165 signalized intersections. The controller hardware will also be upgraded and reused. The City of San Antonio uses the Kimley-Horn software KITS to manage their signalized intersections.

The City of San Antonio will procure software and hardware using the City of Austin's selection process. Once the contract has been authorized by Austin City Council, the City of San Antonio will purchase for their needs off of the Austin contract. Thus, the selected Contractor will have two separate contracts for supplying software and hardware.

For the purposes of this procurement, the software that is procured for installation on the traffic signal controller hardware will be called “software”. Any use of the word firmware shall also mean “software”.

3.2 **Project Requirements**

The City has compiled a comprehensive list of Functional and Technical Requirements that the software Contractor will provide. Those requirements are identified in Appendix A as the Local Controller Software Requirements Compliance Matrix. The Requirements Matrix provides an extensive list of functionality that is identified as either Mandatory or Desired. All Mandatory requirements shall be met as part of this project. The City intends to achieve as many of the Desired requirements as possible while balancing cost with best value.

3.3 **Support for NTCIP**

3.3.1 General

The local controller software shall comply with all applicable National Transportation Communication for ITS Protocol (NTCIP) standards documents. Compliance shall be to the currently approved or recommended version(s) of the relevant NTCIP standards on the date of the initial acceptance of the software by the Cities.

The controller software must be able to implement Nationally defined NTCIP messages called for in the Requirements Specification.

3.3.2 Documentation

The software shall be supplied with full documentation. Documentation shall include electronic and hard copy. The electronic copy shall be provided on a flash drive, DVD, or CD-ROM. The documentation shall include all NTCIP standard MIBs and extensions, developer-specific MIBs, and all SNMP/STMP data elements. All MIBs shall be provided in American Standard Code for Information Exchange (ASCII) format using ASN.1 notation.

3.3.3 MIB Extensions

The Contractor shall clearly define all MIB extensions. Primarily, all extensions shall be accomplished by the following methods:

- Extending the capabilities of existing standard features.
- Defining new data elements or features under a developer-specific MIB extension.

To the extent possible, the replacement of a partially complete feature with a complete custom feature should be avoided.

3.3.4 Support of NTCIP Standards, Amendments and Revisions

The Contractor shall address any proposed revisions or draft amendments to the required NTCIP MIBs available during the initial procurement stage and the impact on the proposed software’s NTCIP compliance and/or ability to meet the functional requirements of this specification. The initial procurement stage shall be extended from the date of release of this specification to one (1) year beyond the initial acceptance of the software by the Cities.

3.3.5 Object Range Values

All objects required by these specifications shall support all values within their standardized ranges, unless otherwise approved by the City. A size, range, or enumerated listing indicated in the object's SYNTAX field or through descriptive text in the object's DESCRIPTION field of the relevant standard defines the standardized range.

The Contractor shall prepare a table of object range values for each object In NTCIP Standards1201 and 1202 and identify any variances from the standard ranges that are required to meet this specification.

3.3.6 NTCIP Standards

The Contractor shall define an entire NTCIP stack and identify the NTCIP, or other standards that will be required at each level to meet the specifications contained in this document. For each NTCIP standard, Contractor shall complete a Profile Implementation Conformance Statement (PICS) identifying each required object. All mandatory objects identified in the standards shall be included in the PICS.

As a minimum, the software shall comply with the following standards:

General

- NTCIP 1101 v01.12 - NTCIP Simple Transportation Management Framework
  - The software shall comply with Conformance Level 2
- NCTIP 1102: 2004 – NTCIP Octet Encoding Rules (OER)
- NTCIP 1103 v01 - NTCIP Transportation Management Protocols (TMP)
  - The software shall include support for the "Simple Fixed Message Protocol" (SFMP)
- NTCIP 8004 v01 - NTCIP Structure and Identification of Management Information (SMI)

Information Level

- NTCIP 1201v03 – NTCIP Global Objects (GO) Definitions
- NTCIP 1202:2005 – NTCIP Object Definitions for ASC
  - The software shall fully implement all mandatory objects of all mandatory and optional conformance groups defined in this standard

Application Level

- NTCIP 2303:2001 v01.06 – NTCIP AP-FTP
- NTCIP 2301: v02 - NTCIP AP-STMF

Transport Level

- NTCIP 2201:2003 - NTCIP TP-Transportation Transport Profile
- NTCIP 2202:2001 - NTCIP TP-Internet (UDP/IP) Transport Profile

Subnetwork Level

- NTCIP 2101:2001 - NTCIP SP-PMPP/RS232
- NTCIP 2104:2003 – NTCIP SP-Ethernet

Contractors are required to identify and comply with any additional NTCIP or other standards necessary to meet the specifications of this document.

3.4 **Possible Database Conversions**

The City may be interested in acquiring additional services for providing database conversions. There are three categories or classes of database conversions, which are simple, moderate, and complex. An example of a simple intersection would be a 2 phase operation, such as the intersection of W 5th St., and Lavaca St. An example of a moderate intersection would be an eight phase operation, such as N. Lamar Blvd. and Airport Blvd. And an example of a complex intersection would be a diamond operation, such as US 183 and N Capital of Texas Highway.

3.5 **City's Responsibilities**

The City will be responsible for:

- Providing single point of contact for all technical and operational issues.
- Converting all controller databases from NextPhase to the new firmware.
- Executing the Contract and all resulting Delivery Orders.
- Testing the controller software for acceptance before field deployment at the following milestones:

initial delivery of the software, final acceptance of software which meet all minimum requirements, upgrade testing conducted for all upgrades, and other milestones as required.

- Reporting all suspected issues and concerns to the Contractor.
- Changing hardware, such as the 1C card, to complete the requirements of the software.

3.6 **Contractor's Responsibilities**

The Contractor shall be responsible for:

- Providing single point of contact for all technical and operational issues.
- Providing controller software license agreement.
- Providing controller software Manufacture Information Base (MIB).
- Providing controller software.
- Providing controller software user manual and other supporting documentation.
- Providing specified hardware.
- Providing training and oversight of the conversion of the first 20 controller databases from NextPhase to the new firmware.
- Converting controller databases.
- Working with Kimley-Horn (as identified below).
- Supporting all tests conducted by the City.

3.7 **Working with Kimley-Horn for Support in KITS**

Both Cities have a significant investment in the KITS software. The Contractor of the supplied controller software will play an important role in the advancement of traffic management and control. It is critical that all parties under Contract to the City of Austin and City of San Antonio place mobility and congestion management as the number one priority. To that end, all parties shall uphold open communication and sharing of information such as any changes in the Contractor's software (subject to the stated Technical Requirements) shall be communicated immediately and openly to Kimley-Horn so that the KITS software can be modified accordingly for the life of the use of the software by either City. Non-Disclosure Agreements (NDAs) may be utilized to protect the Contractors rights. The withholding of any critical information can be considered sufficient grounds for canceling any future contracts and possible litigation.

Kimley-Horn responsibilities will be:

- Working with the selected Contractor in the exchange the communication protocols for all objects.
- Providing quick feedback to the Contractor during testing to report on issues identified.
- Cooperating with the Contractor to ensure compliance.

3.8 **Federal Funding**

The Contract will be supported in part with federal funds, therefore, the following federal laws and standards apply, including the following:

- Title 42 U.S.C. §§ 2000d-2000d-7, with the exception of sections 2000d-5 and 2000d-6, also known as – Title VI of the Civil Rights Act of 1964,including any amendments. https://www.justice.gov/crt/title-vi-1964-civil-rights-act
- Title 49 CFR Subtitle A – Office of the Secretary of Transportation, Parts 1-99, including any

amendments. http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title49/49cfrv1_02.tpl

- OMB Circular A-87 – Office of Management and Budget Circular relating to Cost Principles for State, Local and Indian Tribal governments, including any amendments. https://www.whitehouse.gov/omb/circulars_a087_2004
- OMB Circular A-102 – Office of Management and Budget Circular relating to Grants and Cooperative Agreements with State and Local Governments, including any amendments. https://www.whitehouse.gov/omb/circulars_a102
- OMB Circular A-133 – Office of Management and Budget Circular relating to Audits of States, Local Governments and Non-Profit Organizations, including any amendments. https://www.whitehouse.gov/sites/default/files/omb/assets/a133/a133_revised_2007.pdf

3.9 Maintenance and Support

The City may elect to extend the warranty beyond the initial warranty period by executing an annual maintenance and support agreement with the Contractor. The agreement shall extend all the warranty provisions listed herein.

The Contractor shall have a maintenance and support agreement that shall be renewable, at the City's option, on an annual basis.

3.10 Software Upgrades

During the initial warranty period and all subsequent maintenance and support agreement periods, the selected Contractor shall provide all software upgrades at no cost to the City.. Software upgrades shall include all maintenance, support, and functionality upgrades. New Functionality upgrades shall include all upgrades to the software regardless of the source of the new functionality.

Software upgrades shall include maintenance updates to correct defects in the software or major upgrades that add new functional features to the software.

Each upgrade shall be accompanied by a readme file describing the changes/revisions in the software. Each upgrade shall include new documentation including the user manual, installation guide, and the MIB.

All upgrades shall maintain compatibility with the requirements presented in this contract including hardware, functionality, communications, and compliance to applicable standards.

3.11 Training

The selected Contractor shall provide training on the software prior to and during field deployment and implementation. Following deployment and implementation of the software, and within the initial warranty period, the Contractor shall provide an additional training annually as requested by the City. The Contractor shall provide the quantity of hours recommended to adequately instruct the City signal technicians and engineers in the use of the proposed software. Training shall be tailored for the specific audience (i.e. management, engineers, field technicians) to be trained. Prior to any training, the Contractor shall provide to the City for review and approval, a training syllabus and all training materials of the training program.

3.12 Schedule

The City has established the following tentative timeline for this solicitation:

January 9, 2017	Advertise release of RFP
January 25, 2017	Pre-proposal Meeting
February 9, 2017	Submittals Due
February 29, 2017	Evaluation Committee completes review of submittals and notifies top three respondents
March 7, 2017	Interviews
March 2017	Field and Lab test conducted by City staff
April 30, 2017	Final Decision by the City. All respondents will be notified of the selected Offeror

*Please note – ALL dates above are estimates and subject to change

AUSTIN TRANSPORTATION DEPARTMENT
PURCHASING OFFICE
PROPOSAL PREPARATION INSTRUCTIONS AND EVALUATION FACTORS
SOLICITATION NUMBER: RFP JTH0309
SECTION 0600

1. **PROPOSAL FORMAT**

All Proposals shall submit 1 original paper copy and 10 electronic copies on a flash drive of your Proposal.

The original copy shall be submitted on 8.5 x 11 inch paper, bound or in a 3-ring binder, shall be clearly labeled as "**ORIGINAL**" and shall include the original signature of the person authorized to sign on behalf of the Offeror. Use tabs to divide each part of your Proposal and include a Table of Contents with page numbers linking the content of the Proposal.

The electronic copies shall be submitted on flash drives, and shall be an exact replica of the original paper copy. Each tab shall be a separate document on the flash drive. Please do not combine all tabs into one single Proposal.

Proposers shall provide all details the information described below and any additional information deemed necessary to evaluate your Proposal.

Tab A. Letter of Transmittal -This letter shall include the name and address of the offering company (after selection referred to as "Offeror") as well as contact information for individuals within the company who are authorized to answer technical, pricing, and contractual questions. A person authorized to bind the company must sign the letter.

Tab B. Executive Summary - The Executive Summary shall provide a short (no more than 2 pages) synopsis of the significant points in the proposal including a summary of the proposed functionality and a description of the capabilities of the Offeror. At a minimum, the executive summary shall include the following:

- Name of proposed software
- Software's non-compliance to minimum requirements – list any desired requirements not met (all mandatory requirements must be met)
- List of exceptional, or notable, features currently provided by the proposed software
- List of additional software features not described in the RFP.

Tab C. City of Austin Purchasing Documents

Complete and submit the following documents:

a. Completed and Signed Offer Sheet (pages 1-3)

b. Signed Addendums (all pages)

c. Completed Section 0605 – Local Business Presence Identification Form
If you will be utilizing Subcontractors, include the Subcontractor's information on this form.

d. Completed Section 0700 – Reference Sheet

e. Completed and Signed Section 0800 – Non-Discrimination Certification

f. Completed Section 0815 – Living Wages Contractor Certification

g. Completed Section 0835 – Non-Resident Bidder Provisions

h. Completed and Signed Section 0900 (first and second page) – Minority- and Women-Owned Business Enterprise (MBE/WBE) No Goals Form

If you will be utilizing Subcontractors, you must contact the Small and Minority Business Resources Department (SMBR) at (512) 974-7600 to obtain a list of MBE and WBE firms available to perform the service and include the completed Section 0900, MBE/WBE No Goals Form with your Proposal packet. Include the Section 0900, MBE/WBE No Goals Form in Tab 1 of your Proposal along with all the required SMBR documentation and Good Faith Efforts.

i. Completed Section 301 – Purchasing Exceptions Form

Tab D. Background and Experience - At a minimum, this section shall address the following:

- Offeror's history of providing controller software
- Description of products and services provided
- Software development experience of staff
- Number and location of software development staff (FTE)
- Involvement/leadership in applicable industry standards development
- Quality assurance/quality control procedures
- Training program
- Issue resolution procedures

Tab E. Staff – This section shall identify key individuals, along with supporting resumes, that City staff will interface on software delivery, troubleshooting, training, maintenance and support.

Tab F. Proposed Solutions & Compliance:

The City has compiled a comprehensive list of Functional and Technical Requirements that the software Offeror will provide. Those requirements are identified in Appendix A as the Local Controller Software Requirements Compliance Matrix.

For each requirement, the Offeror shall clearly identify if the requirement is currently met within the software version that will be provided as the delivery to the City, can be met with configuration, and if the functionality cannot be met. For any functionality that cannot be met, a clear and concise comment should be provided. If there is a significant cost associated with adding a requirement into the current release version of the software, that in the opinion of the vendor, warrants further discussion, the Offeror shall provide a comment.

Compliance to Local Controller Software Requirements – This section will include the following information:

- Name and current version of proposed software
- Version history
- Development roadmap
- Number of field deployments
- Software warranty
- Statement of compliance to National Transportation Communication for Intelligent Transportation System Protocol (NTCIP) Standards as identified in this RFP
- Additional functionality provided at no additional charge
- Explanation and description of how transit signal priority will be met as identified in Section 0500 and the requirements matrix of this RFP

- Explanation and description of how emergency vehicle preemption will be met as identified in Section 0500 and the requirements matrix of this RFP
- Offeror's understanding of and plan to meet the mandatory functional requirements and desired features not met by the current version of the software
- List of notable requirements that the proposed software exceeds

Compliance Matrix - Offerors shall complete and include the Appendix A Local Controller Software Requirements Compliance Matrix included in the RFP. Provide any comments necessary, such as to explain variances or exceptions. Please note that all requirements deemed as mandatory must be met in order to be considered for award.

NTCIP Compliance Statements – Offerors shall develop and include the NTCIP compliance statements described in this RFP.

Schedule – Offerors shall provide a proposed schedule for delivery of the software. The schedule shall include proposed durations for the planning, design, and implementation tasks for any software development required to meet the stated requirements of this RFP.

Sample License Agreement - Offerors shall include their standard software licensing agreement for City review.

Documentation
The selected Offeror, upon selection, shall provide the following documentation:

- User manuals
- Installation guide
- MIBs

All documentation will be provided in electronic format. Examples of standard documentation may be provided with the Offeror's proposal in electronic format (supplied on a flash drive, DVD, or publicly accessible share drive), which may be considered by the Evaluation committee as evidence towards meeting this requirement.

All documentation should be formatted and indexed with full search capabilities.

The selected Offeror shall grant the City the right to reproduce unlimited quantities of any generic and custom documents for use by the City and its users.

The Offeror shall provide new documentation with all software upgrades and at any other time that the documentation becomes obsolete or does not represent current procedures or accurate information.

Proposed Solutions

The Contractor shall provide a written explanation how they will implement controller software and hardware in support of City signalized intersections, including roll out schedule, training plans, troubleshooting, etc. in support of the Appendix A Local Controller Software Requirements Compliance Matrix.

The Contractor shall provide written explanation that describes how the Contractor will provide Prioritor function within NextPhase version 1.7.7 or an enhanced system.

Tab G. **Matrix of Exceptions**

Be advised that exceptions to any portion of the Solicitation may jeopardize acceptance of the Proposal. Provide a "Matrix of Exceptions" to the requirements of the RFP. Identify the requirement, describe the nature of the deviation and provide an explanation or propose an alternative. Proposal may demonstrate an alternate approach. This is not intended to be an elimination factor but a measure of proposer ability to meet the City's technical specifications.

This matrix shall include any exceptions for all sections of the RFP and Scope of Work. The Offeror must clearly indicate each exception taken and indicate the alternative language along with the business need for the alternative language. The failure to identify exceptions or proposed changes with a full explanation will constitute acceptance by the Offeror of the Solicitation as proposed by the City. The City reserves the right to reject a Proposal containing exceptions, additions, qualifications or conditions not called for in the Solicitation.

Tab H. Authorized Negotiator: Include name, address, e-mail address, and telephone number of person in your organization authorized to negotiate Contract terms and render binding decisions on Contract matters.

Tab I. Cost Proposal:

Complete Item 0601, Price Form, Local Controller Software, located on the last page of Section 0600.

Tab J. Optional & Added Features:

All Offerors may recommend additional items which shall be labeled as "Optional" and be included in your Proposal separate from any required items.

2. NON-COLLUSION, NON-CONFLICT OF INTEREST, AND ANTI-LOBBYING:

a. On November 10, 2011, the Austin City Council adopted Ordinance No. 20111110-052 amending Chapter 2-7, Article 6 of the City Code relating to Anti-Lobbying and Procurement. The policy defined in this Code applies to Solicitations for goods and/or services requiring City Council approval under City Charter Article VII, Section 15 (Purchase Procedures). During the No-Contact Period, Offerors or potential Offerors are prohibited from making a representation to anyone other than the Authorized Contact Person in the Solicitation as the contact for questions and comments regarding the Solicitation.

b. If during the No-Contact Period an Offeror makes a representation to anyone other than the Authorized Contact Person for the Solicitation, the Offeror's Offer is disqualified from further consideration except as permitted in the Ordinance.

c. If a Respondent has been disqualified under this article more than two times in a sixty (60) month period, the Purchasing Officer shall debar the Offeror from doing business with the City for a period not to exceed three (3) years, provided the Respondent is given written notice and a hearing in advance of the debarment.

d. The City requires Offerors submitting Offers on this Solicitation to provide a signed Section 0810, Non-Collusion, Non-Conflict of Interest, and Anti-Lobbying Affidavit certifying that the Offeror has not in any way directly or indirectly made representations to anyone other than the Authorized Contact Person during the No-Contact Period as defined in the Ordinance The text of the City Ordinance is posted on the Internet at: http://www.ci.austin.tx.us/edims/document.cfm?id=161145

3. Proposal Acceptance Period: All proposals are valid for a period of one hundred and eighty (180) calendar days subsequent to the RFP closing date unless a longer acceptance period is offered in the proposal

4. Proprietary Information: All material submitted to the City becomes public property and is subject to the Texas Open Records Act upon receipt. If an Offeror does not desire proprietary information in the proposal to be disclosed, each page must be identified and marked proprietary at time of submittal. The City will, to the extent allowed by law, endeavor to protect such information from disclosure. The final decision as to what information must be disclosed, however, lies with the Texas Attorney General. Failure to identify proprietary information will result in all unmarked sections being deemed non-proprietary and available upon public request.

5. **PROPOSAL PREPARATION COSTS**:

All costs directly or indirectly related to preparation of a response to the RFP or any oral presentation required to supplement and/or clarify a proposal which may be required by the ACCD shall be the sole responsibility of the Offeror.

6. **EVALUATION FACTORS AND AWARD**

A. Evaluation Criteria

This procurement will comply with applicable City Policy. The successful Proposer will be selected by the City on a rational basis. Evaluation factors outlined in Paragraph B below shall be applied to all eligible, responsive Proposers in comparing proposals and selecting the Best Offeror. Award of a Contract may be made without discussion with Proposers after proposals are received. Proposals should, therefore, be submitted on the most favorable terms.

B. Evaluation Factors*:*

i. 100 points.

(1) Proposed Solutions, Compliance & Exceptions- **40 Points**

(2) Qualifications, Experience & Staff- **25 Points**

(3) Proposed Cost-**25 Points**

(4) LOCAL BUSINESS PRESENCE **10 points**

The City seeks opportunities for businesses in the Austin Corporate City Limits to participate on City Contracts. A firm (Offeror or Subcontractor) is considered to have a Local Business Presence if the firm is headquartered in the Austin Corporate City Limits, or has a branch office located in the Austin Corporate City Limits in operation for the last five (5) years. The City defines headquarters as the administrative center where most of the important functions and full responsibility for managing and coordinating the business activities of the firm are located. The City defines branch office as a smaller, remotely located office that is separate from a firm's headquarters that offers the services requested and required under this solicitation. Points will be awarded through a combination of the Offeror's Local Business Presence and/or the Local Business Presence of their Subcontractors. Evaluation of the Team's Percentage of Local Business Presence will be based on the dollar amount of work as reflected in the Offeror's MBE/WBE Compliance Plan or MBE/WBE Utilization Plan. Specify if and by which definition the Offeror or Subcontractor(s) have a local business presence.

Team's Local Business Presence	Points Awarded
Local business presence of 90% to 100%	10
Local business presence of 75% to 89%	8
Local business presence of 50% to 74%	6
Local business presence of 25% to 49%	4
Local presence of between 1 and 24%	2
No local presence	0

ii. Presentation & Demonstration Process The City will score proposals on the basis of the criteria listed above. The City may select a "shortlist" of Proposers based on their scores. "Shortlisted" proposers may be invited for presentations and demonstrations with the City. The City reserves the right to re-score "shortlisted" proposals as a result, and to make award recommendations on that basis.

C. Oral Interview/Presentation:

Only top ranked Offerors will be invited for an oral interview/presentation. An outline will be provided for the topics to be covered in the interview. The City may provide the Offerors with a list of proposed key personnel required to attend and participate in the meeting.

Offerors and proposed key personnel should be prepared to address any questions that may be asked by the City.

During the interview, the Offerors must conduct a presentation of their solution. The Offerors must provide basic instruction on programming the following configurations:

- Major intersection with 8 phases, multiple overlaps, and complex phase sequence
- Major diamond interchange that may use Figure 3, 4, 6, or 7 configuration
- Non-standard diamond interchange
- Pedestrian Hybrid Beacon
- An intersection with transit signal priority

Each Offeror must provide any equipment and software used to conduct the presentation. Pre-

configured databases may be used in the presentation. It is very important, however, that the Offeror fully explain in simple methodical terms how intersections are configured.

As evidence that the Offerors' firmware will be compatible with the City's field network, the Offeror will be required to demonstrate functionality using the Ethernet 72102 switches used in the field. The City's network is illustrated in **Appendix B.**

As stated in the requirements, NTCIP is a key aspect of this project, in addition to providing the full MIB to the City. Full documentation of the Offeror's support for all NTCIP objects will be required of the contract and at the Offeror's option can be brought to the interview for discussion. Also not required until post award, the documentation of the manufactures proprietary MIB can also be brought to the interview for discussion.

Demonstration Process: Following the oral interview and presentation, the City will conduct a "hands-on" evaluation of the Offerors' software package. Offerors must be prepared to provide the City the following equipment and supporting documentation for this evaluation:

- Four (4) 2070 ATC controllers with proposed local controller software installed
- A copy of software to be installed on City computers to communicate with the supplies controllers
- Four (4) user manuals

These controllers will be placed into the City-owned controller cabinets in the lab for comprehensive testing. Controllers may also be installed in a live intersection at the City's discretion. The firm of Kimley-Horn and Associates will connect the controllers located in the lab to the KITS software. Basic mandatory objects will be polled, and reported. Upload and Download tests will be performed and reported.

All equipment will be returned to the Offerors within four weeks following final selection.

All top ranked Offerors will be given the identical opportunities for the provision of information to the City.

AUSTIN TRANSPORTATION DEPARTMENT
PURCHASING OFFICE
ITEM 0601 – PRICE FORM, LOCAL CONTROLLER SOFTWARE
SOLICITATION NUMBER: RFP JTH0309

	Bid Item Description	**Mandatory**	**Basis of Bid Quantity**	**Unit Price**	**Total**
	SOFTWARE				
1	Local controller software license fee, when purchased individually	Yes	500		
2	Local controller software license fee, site license Number of individual intersections at which point the site license becomes active: _____.	Yes			
3	Training, per 8 hr. day (Offeror may expand as necessary to provide clarity—attach pricing schedule to this form)	Yes	3		
4	Maintenance and Support, per year	Yes	1		
	HARDWARE				
5	Model 2070 (Linux operating system, 64 MB SDRAM, 16 MB Flash Memory, 8x40 LCD display)	Yes	1		
	Model 2070 Components:				
6	Model 2070 1C card, with controller software installed, and includes: (Compliant to ATC 5.2b, ATC 6.1 (or latest), open Linux operating system, 3.3v datakey socket, 2 10/100 RJ45 Ethernet ports, TEES compliant D Type 25 pin C125 port, 1 USB port, 64 MB SDRAM, 16 MB Flash memory, 400 MH core speed)	Yes	500		
7	Model 2070 1E card, with controller software installed, and includes: (compliant to TEES 2009, OS-9 RTOS, 32 MB PSRAM, 8 MB flash memory, 2 MB non-volatile SRAM, 2 10/100 RJ45 Ethernet ports)	Yes	1		
8	ATC Controller, fully loaded Includes 2070 ATC CPU module, 2070 2B or 2E Field I/O Module, 2070 3B LCD front panel module, 2070 4A power module.	Yes	500		
	SERVICES (may use fields provided or attach additional pricing schedule with this Price Form)				
9	Database conversion, low complexity	Desired			
10	Database conversion, medium complexity	Desired			
11	Database conversion, high complexity	Desired			
12	Field installation of controller	Desired			

AUSTIN TRANSPORTATION DEPARTMENT
PURCHASING OFFICE
ITEM 0601 – PRICE FORM, LOCAL CONTROLLER SOFTWARE
SOLICITATION NUMBER: RFP JTH0309

Appendix A
Local Controller Software Requirements Compliance Matrix

Category ID	*Requirement/Description*	*Mandatory*	*Desired*	*Currently Available*	*Available with Configuration*	*Cannot be Provided as Part of the Project*	*Comments*
1	**GENERAL Local Controller Software shall:**						
1.1	Be menu driven with all parameters allowed to be programmed through direct keyboard interface. Because of the complexity of software there shall be a minimum of ten programmable short-cut keys to access user defined screens.	Mandatory					
1.2	All controller functions shall be accessible and editable by means of menus. All menu items shall be labeled in plain English. Likewise, all elements in data tables and displays shall be clearly labeled in English. Hexadecimal numbers are not permitted in any display.	Mandatory					
1.3	Where dynamic displays are used to indicate the duration of a controller phase, function, or output they shall count upward, starting at zero. At a minimum dynamic displays for minimum green, maximum green, yellow, all red, local cycle counter, master cycle counter, and phase.	Mandatory					
1.4	Cycle counters shall count up to a value equal to the length of the current cycle minus one, then return to zero and begin counting up again	Mandatory					
1.5	Gap timers shall count downward, starting at the programmed or, when gap reduction is used, calculated gap time	Mandatory					
1.6	Have features that will allow the controller database to be backed up to internal memory, USB Flash Drive, and DataKey.	Mandatory					
1.7	The software shall run on LINUX-based 2070-1C cards. It desirable, but not a requirement, that the software support legacy 2070 controllers with 1B and 1E CPU cards. Respondent shall indicate options, and limitations with either. Local Controller Software shall run on the following Manufacturer CPU cards:	Mandatory					
1.7.1	Econolite	Mandatory					
1.7.2	Intelight	Mandatory					
1.7.3	McCain	Mandatory					
1.7.4	Peek/formerly “Quixote”	Mandatory					
1.7.5	Safetran	Mandatory					
1.7.6	Siemens	Mandatory					
1.8	Use the following I/O configurations on the 2070		Desired				
1.8.1	2070-2A		Desired				
1.8.2	2070-2B		Desired				
1.8.3	2020-2E		Desired				
1.8.4	2070-2N		Desired				
1.8.5	2070-2S		Desired				
1.9	Proposed Local Controller Software must be able to use Network Time Protocol for proper time synchronization. GPS reference should also be supported for time clock synchronization.	Mandatory					
1.10	The Local Controller Software shall allow data to be entered from a personal computer, ethernet port, or serial port.	Mandatory					
1.11	Data entry and modification shall be accessible via an web-enabled interface hosted on the local controller and accessible via the controller's programmed IP address or host name when on an IP network.		Desired				
1.12	The Local Controller Software shall support export of the parameter database in a format that supports copy/paste		Desired				
1.13	A backup method should be provided that would allow immediate reloading of all the controller's parameters via the front panel. The parameters should be backed up onto a nonvolatile memory device (such as the 2070 datakey and USB). Changes made to the controller timing should be able to be automatically backed up to the key when changed from the central system.		Desired				

Appendix A
Local Controller Software Requirements Compliance Matrix

Category ID	*Requirement/Description*	*Mandatory*	*Desired*	*Currently Available*	*Available with Configuration*	*Cannot be Provided as Part of the Project*	*Comments*
1.14	The Local Controller Software shall be able to hold multiple full database copies that can be switched by selection on the front panel.		Desired				

Category ID	*Requirement/Description*	*Mandatory*	*Desired*	*Currently Available*	*Available with Configuration*	*Cannot be Provided as Part of the Project*	*Comments*
1	**GENERAL (cont.) Local Controller Software shall:**						
1.15	The Local Controller Software shall support the following cabinet types:	Mandatory					
1.15.1	NEMA TS-1	Mandatory					
1.15.2	NEMA TS-2	Mandatory					
1.15.3	Caltrans 332	Mandatory					
1.15.4	Caltrans 336	Mandatory					
1.15.5	ITS	Mandatory					
1.15.6	ATC	Mandatory					
1.16	The Local Controller Software shall be able to request a full database download from central from the front panel.		Desired				
1.17	The Local Controller Software shall be able to request a full database upload to central from the front panel.		Desired				
2	**DISPLAY**						
2.1	The Local Controller Software shall provide indications to facilitate the determination of the operation. The indications shall include the following:	Mandatory					
2.1.1	Phase or phases in service	Mandatory					
2.1.2	Phases or phases next to be serviced	Mandatory					
2.1.3	Presence of a vehicle call	Mandatory					
2.1.4	Presence of a pedestrian call	Mandatory					
2.2	The Local Controller Software shall provide for the simultaneous presentation for all phases		Desired				
2.3	The Local Controller Software shall provide indications to indicate the status of each active phase in the ring. These indications shall include the following:	Mandatory					
2.3.1	Initial	Mandatory					
2.3.2	Extension	Mandatory					
2.3.3	Yellow Change	Mandatory					
2.3.4	Red Clearance	Mandatory					
2.3.5	Walk	Mandatory					
2.3.6	Pedestrian Clearance	Mandatory					
2.3.7	Green termination through Gap-out	Mandatory					
2.3.8	Green termination through Maximum time-out	Mandatory					
2.3.9	Green termination through Force-off	Mandatory					
2.3.10	Rest State	Mandatory					
3	**SECURITY Local Controller Software shall:**						
3.1	Not require any “hardware” lock to operate.	Mandatory					
3.2	Local Controller Software shall be provided with incremental password protection.	Mandatory					
4	**VEHICULAR/PEDESTRIAN/BICYCLE PHASES**						
4.1	Local Controller Software shall be provided with a minimum sixteen phases. Each phase shall have a minimum of three maximum times per phase, with dynamic max operation capability.	Mandatory					
4.2	The Local Controller Software shall provide at least 4 concurrently timing rings. The initial default setup for the rings, barriers, and phases shall follow the standard NEMA eight-phase, dual-ring configuration	Mandatory					
4.3	The Local Controller Software shall provide multiple gap/passage, max greens, and pedestrian times, all TOD selectable.		Desired				
4.4	Each phase will have minimum, maximum and soft recall modes.	Mandatory					
4.5	Local Controller Software shall provide early and delayed walk timing via program entry without using any additional logic or dummy phase.	Mandatory					

Category ID	*Requirement/Description*	*Mandatory*	*Desired*	*Currently Available*	*Available with Configuration*	*Cannot be Provided as Part of the Project*	*Comments*
4	**VEHICULAR/PEDESTRIAN/BICYCLE PHASES (cont.)**						
4.6	Local Controller Software shall provide pedestrian clearance through yellow/red (configurable from end of red).	Mandatory					
4.7	Local Controller Software shall provide conditional service during free and coordinated operation, with conditional service minimum and maximum green times.	Mandatory					
4.8	Local Controller Software shall provide manual control operation with selectable call, omit, sync and protected pedestrian clearance phases.	Mandatory					
4.9	Local Controller Software shall provide per phase preempt timing (vehicle and pedestrian).		Desired				
4.10	Local Controller Software shall provide ability to change Phase Next decision during Phase Clearances.	Mandatory					
4.11	Local Controller Software shall provide pedestrian recycle modes provided for late/multiple service opportunities.		Desired				
4.12	Local Controller Software shall provide for exclusive pedestrian timing, such that all pedestrian phases to display “WALK”, allowing diagonal pedestrian crossing.		Desired				
4.13	Local Controller Software shall provide for any pedestrian phase to be assigned as an exclusive phase, all other vehicular phases displaying red.		Desired				
4.14	Menu selectable operational templates for 4-phase, 3- phase, lag/lead and lead/lag diamond phasing shall be provided.		Desired				
4.15	Where NTCIP 1202 specifies that a parameter shall be programmable in increments of 0.1 seconds, then the controller display shall likewise display it in increments of 0.1 seconds. Otherwise, data shall be displayed in increments of one second.		Desired				
4.16	Simultaneous Gap Out shall allow the user to ensure that defined phases which will terminate, must simultaneously reach a point of being committed to terminate before Green timing termination shall begin.	Mandatory					
4.16.1	Simultaneous Gap Out shall be enabled/disabled via program entry	Mandatory					
4.17	Dual Entry provides that one phase in each ring must be in service, subject to compatibility, at all times		Desired				
4.17.1	Dual Entry shall be selectable via program entry in the ring to be active		Desired				
4.18	Red Revert – The Local Controller Software shall provide a minimum red indication ranging from 2-6 seconds following the Yellow Change interval and prior to the next display of Green on the same phase.		Desired				
4.19	The Local Controller Software shall support Dallas Phasing and the Arlington Phasing.	Mandatory					
4.20	The Local Controller Software shall be capable of providing fully actuated and fixed time diamond interchange operation. The Local Controller Software shall be able to implement diamond operation as defined in section 11170.6 part E of the Texas Department of Transportation “Departmental Materials Specification 11170 – Fully Actuated, Solid-State Traffic Controller Assembly” dated July 2012.The Local Controller Software shall support the following diamond interchange operations:		Desired				
4.20.1	Figure 3 - Three Phase (Lag-Lag)		Desired				
4.20.2	Figure 6 – Three Phase Variation (Lead-Lag)		Desired				
4.20.3	Figure 7 – Three Phase Variation (Lag-Lead)		Desired				
4.20.4	Figure 4 – Four Phase w/ Overlaps (TTI Phasing)		Desired				
4.20.5	Three Level Diamond Four Phase with Four Overlaps		Desired				

Category ID	*Requirement/Description*	*Mandatory*	*Desired*	*Currently Available*	*Available with Configuration*	*Cannot be Provided as Part of the Project*	*Comments*
4	**VEHICULAR/PEDESTRIAN/BICYCLE PHASES (cont.)**						
4.21	The Local Controller Software shall be capable of adding custom predefined patterns that can be saved to be used on any controller. The Local Controller Software shall support the following custom predefined patterns:	Mandatory					
4.21.1	SPUI	Mandatory					
4.21.2	DLT	Mandatory					
4.21.3	DDI	Mandatory					
4.22	The Local Controller Software shall have an option for a separate minimum green time, red revert, and advanced warning flasher for bicycles.	Mandatory					
4.23	The Local Controller Software shall have an option for a separate passage time for bicycles.		Desired				
4.24	The Local Controller Software shall have an extended button press option to lengthen walk times.		Desired				
4.25	The Local Controller Software shall a safeguard to prevent the pedestrian phases from extending clearance phases at diamond interchanges.		Desired				
4.26	The Local Controller Software shall have an option for variable initial green time, with the following parameters:		Desired				
4.26.1	Added initial green time		Desired				
4.26.2	Maximum initial green time		Desired				
4.27	The Local Controller Software shall have an option for gap reduction, with the following parameters:		Desired				
4.27.1	Time-Before-Reduction		Desired				
4.27.2	Time-To-Reduce		Desired				
4.27.3	Minimum Gap		Desired				
5	**TRANSIT PHASING - Local Controller Software shall provide:**						
5.1	Minimum of eight transit phases.	Mandatory					
5.2	Transit phases to support two or three section control heads for bus/train indications.	Mandatory					
5.3	Advanced warning signal control per transit phase (solid or flashing indications).	Mandatory					
5.4	Actuated or recall operation.	Mandatory					
5.5	Normal or priority based service.	Mandatory					
6	**RINGS**						
6.1	Minimum of four rings (Single Intersection or two independent intersections).	Mandatory					
6.2	Each of the four rings can be assigned to one of the two ring-groups.		Desired				
7	**OVERLAPS**						
7.1	The Local Controller Software shall provide internally generated Overlaps	Mandatory					
7.2	The Local Controller Software shall provide a minimum of sixteen timed Overlaps.	Mandatory					
7.3	The Local Controller Software shall provide vehicle and pedestrian movements for each overlap.	Mandatory					
7.4	The Local Controller Software shall provide actuated pedestrian movements for each overlap.	Mandatory					
7.5	The Local Controller Software shall provide early and delayed walk timing for each overlap.	Mandatory					
7.6	The Local Controller Software shall provide pedestrian rest-in-walk across multiple phases.	Mandatory					
7.7	The Local Controller Software shall provide per overlap preempt timing (vehicle and pedestrian).	Mandatory					
7.8	Each Overlap shall have its own timing parameters	Mandatory					

Category ID	*Requirement/Description*	*Mandatory*	*Desired*	*Currently Available*	*Available with Configuration*	*Cannot be Provided as Part of the Project*	*Comments*
7.9	Each overlap output shall be configurable to display any of the three output colors.	Mandatory					
7.10	Each overlap output shall be configurable to be dark	Mandatory					
7	**OVERLAPS (cont.)**						
7.11	In addition to defining parent phases, overlaps should be configurable with the following parameters that impact their operation:	Mandatory					
7.11.1	Negative pedestrian phases	Mandatory					
7.11.1	Negative vehicle phases	Mandatory					
7.11.1	Negative overlaps	Mandatory					
7.12	If a negative vehicle or pedestrian phase is next and the overlap is green, the overlap should terminate and time its yellow change and red clearance interval before the negative phase displays green.	Mandatory					
7.13	If a negative overlap is green when an overlap would normally be turning green then the overlap that is set to turn green will remain in red until the negative overlap has terminated.		Desired				
8	**FLASHING YELLOW ARROW (FYA)**						
8.1	The Local Controller Software shall support Flashing Yellow operation for left turn protective/permissive operation. The output of the flashing yellow arrow movement shall be configurable across two load switch outputs.	Mandatory					
8.2	The Local Controller Software shall provide FYA separate from overlaps.	Mandatory					
8.3	FYA detector logic shall be automatically selected by FYA type selection.	Mandatory					
8.4	Program for start phase, opposing pedestrian movements, delay and skip red options.	Mandatory					
8.5	It should be possible to omit the flashing yellow arrow by time-of-day	Mandatory					
8.6	It should be possible to omit the protected green arrow by time-of-day	Mandatory					
8.7	It should be possible to omit the flashing yellow arrow when a "conflicting" pedestrian phase is timing its WALK or DON'T WALK interval. The flashing yellow arrow should resume flashing when the pedestrian interval has completed. The minimum green time (programmed concurrently with the flashing yellow arrow) must be met in this scenario. This should be accomplished via program entry without using any additional logic or dummy phase.	Mandatory					
8.8	The Local Controller Software shall allow programming of to omit the display of the red arrow when going from the protected condition to the permitted condition of the left turn display. In these cases the flashing yellow arrow would begin immediately after the solid yellow arrow completes its timing and remaining flashing through the programmed all-red clearance interval and the opposing green.	Mandatory					
9	**PEDESTRIAN HYBRID BEACON (PHB) MODULE - The Local Controller Software shall provide**						
9.1	Various operational modes with flash and carryover.	Mandatory					
9.2	One or more can run independently with second ring group.	Mandatory					
9.3	The Local Controller Software shall have the ability to specifiy points in a cycle where a pedestrian call will not be served.	Mandatory					
10	**GENERAL DETECTION - The Local Controller Software shall provide**						
10.1	Minimum of sixty-four vehicle detectors.	Mandatory					
10.2	The Local Controller Software shall support speed, occupancy, and presence detection	Mandatory					
10.3	Each vehicle detector inputs shall be assignable to any one or more phases, via program entry	Mandatory					
10.4	Programmable call and extend phases.	Mandatory					

Category ID	*Requirement/Description*	*Mandatory*	*Desired*	*Currently Available*	*Available with Configuration*	*Cannot be Provided as Part of the Project*	*Comments*
10.5	Delay and extend timing.	Mandatory					
10.6	Stop-bar disconnect mode with carryover (extend) timer.	Mandatory					
10.7	Stop bar disconnect mode for stop bar verse advanced detection.	Mandatory					
10.8	Detector cross switching.	Mandatory					
10.9	No presence/max fail detector diagnostics that can be disabled by TOD.	Mandatory					
10	**GENERAL DETECTION (cont.) - The Local Controller Software shall provide**						
10.10	A minimum of 16 Vehicle Detectors shall be assignable to a system detector function, via program entry	Mandatory					
10.11	Provision for Storing a Demand – The Local Controller Software shall support the following provisions for storing a demand:	Mandatory					
10.11.1	The storing of a call for vehicle service on each vehicle phase when that phase is not displaying a Green indication.	Mandatory					
10.11.2	The storing of a call for pedestrian service on phases equipped with pedestrian time setting, when that phase is not displaying a Walk indication	Mandatory					
10.12	Placement of Maximum Recall – The Local Controller Software shall allow, via program entry, the ability to place a call on a phase such that the Green interval shall be extended to the Maximum Green Time. The programming of recall should be available as a global setting for a phase as well as on a per plan basis.	Mandatory					
10.13	Placement of Minimum Recall – The Local Controller Software shall allow, via program entry, the ability to place a recurring demand for vehicle service on any phase when that phase is not in Green interval. The programming of recall should be available as a global setting for a phase as well as on a per plan basis.	Mandatory					
10.14	Placement of Pedestrian Recall – The Local Controller Software shall allow, via program entry, the ability to place a recurring pedestrian call which shall function in the same manner as an external pedestrian call, except that it shall not recycle the pedestrian service until a conflicting phase is serviced. The programming of recall should be available as a global setting for a phase as well as on a per plan basis.	Mandatory					
10.15	Placement of Call at Phase Termination – The Local Controller Software shall have the user configurable ability to place a call on a terminating phase when the terminating phase has remaining time in the Passage Time.		Desired				
10.16	Conditional Service – The Local Controller Software shall provide conditional service phase selection, via program entry.		Desired				
10.17	The Local Controller Software shall collect high-density data. The data should be able to be be stored locally for 30 days to be retrieved when a communication link is reestablished.	Mandatory					
10.17.1	The Local Controller Software shall collect event and detector data at resolutions of 0.1 seconds	Mandatory					
10.17.2	The Local Controller Software shall adhere to the Purdue controller enumerations schema (http://docs.lib.purdue.edu/jtrpdata) (Indiana Traffic Signal Hi Resolution Data Logger Enumerations)	Mandatory					
10.18	The Local Controller Software shall provide Automatic Detector Diagnostics for the following conditions		Desired				
10.18.1	Max Presence		Desired				
10.18.2	No Activity		Desired				
10.18.3	Erratic Output		Desired				
10.18.4	Failed Communications		Desired				
10.19	The Local Controller Software shall be able to place a vehicle or pedestrian call from the front panel on any phase or overlap that can be toggled off or will automatically be removed after an user selectable timeout period.		Desired				
11	**QUEUE DETECTION - The Local Controller Software shall provide**						
11.1	Minimum of sixteen queue detectors.	Mandatory					

Category ID	*Requirement/Description*	*Mandatory*	*Desired*	*Currently Available*	*Available with Configuration*	*Cannot be Provided as Part of the Project*	*Comments*
11.2	Capability to detect traffic backups.	Mandatory					
11.3	Capable of selecting alternate coordination patterns, maximum green timings or specified preempts.	Mandatory					
11.4	Capability to provide advance green to clear vehicle movements prior to transit vehicle arrival	Mandatory					
12	**PEDESTRIAN/BICYCLE DETECTION - The Local Controller Software shall provide**						
12.1	Minimum of sixteen pedestrian/bicycle detectors.	Mandatory					
12.2	Programmable calls for pedestrian/bicycle phases.	Mandatory					
12.3	Sequential pedestrian/bicycle call, allowing for sequential calling of two pedestrian/bicycle phases.	Mandatory					
12.4	Each pedestrian/bicycle detector inputs shall be assignable to any one or more phases, via program entry		Desired				
12.5	Delay and extend pedestrian/bicycle timing.		Desired				
12.6	Be able to place a vehicle or pedestrian call from the front panel on any phase or overlap that can be toggled off or will automatically be removed after an user selectable timeout period.	Mandatory					
13	**TRANSIT DETECTION - The Local Controller Software shall provide**						
13.1	Minimum of eight transit detectors.	Mandatory					
13.2	Programmable calls for transit phases.	Mandatory					
13.3	Delay and extend timings per each transit phase.	Mandatory					
13.4	Travel time delay.	Mandatory					
13.5	Alternate travel times programmable by TOD.	Mandatory					
13.6	Adaptive arrival time adjustment.	Mandatory					
14	**REMOTE TRANSIT DETECTION - The Local Controller Software shall provide**						
14.1	Minimum of thirty-two remote transit detectors.	Mandatory					
14.2	Calls received from other intersections via Peer-to-Peer network.	Mandatory					
14.3	Travel time delay.	Mandatory					
14.4	Alternate travel times programmable by TOD.	Mandatory					
14.5	Adaptive arrival time adjustment.	Mandatory					
15	**COORDINATION FEATURES - The Local Controller Software shall provide**						
15.1	The Local Controller Software shall be capable of providing coordinated operation	Mandatory					
15.2	Minimum of one-hundred twenty-eight coordination patterns.	Mandatory					
15.3	Cycle time and three offsets per plan and ring group.	Mandatory					
15.4	Flexible global split adjustment for transition.	Mandatory					
15.5	Flexible per phase split adjustment for transition.	Mandatory					
15.6	Fixed/floating force-offs with per phase floating green parameter.	Mandatory					
15.7	Automatic permissive calculations, in single/multi band modes, with permissive limit timer.	Mandatory					
15.8	Ability to enter up to two permissive windows (opening and force off) per phase in lieu of automatically calculating from split		Desired				
15.9	Three pedestrian permissive modes per pattern.	Mandatory					
15.10	Selectable re-service phases (fully-actuated coordination).	Mandatory					
15.11	Double service of phases without use of overlaps.	Mandatory					
15.12	Actuated coordinated phases can gap-out early and redistribute unused time to movements with greater demand.	Mandatory					
15.13	Programmable recalls, omits, and alternate base timing for each pattern.	Mandatory					
15.14	Adaptive splits per timing pattern with global step and threshold values.	Mandatory					
15.15	Multiple interconnect modes to include at a minimum of TOD, central control via hardwire or twisted pair, IP based communication.	Mandatory					

Category ID	*Requirement/Description*	*Mandatory*	*Desired*	*Currently Available*	*Available with Configuration*	*Cannot be Provided as Part of the Project*	*Comments*
15.16	In the absence of central control, a local controller can be operate in a “Master” mode utilizing twisted-pair, IP or hard- wire inner-connect connectivity.	Mandatory					
15.17	Multiple transition modes shall be provided for programmed pattern changes. Controller shall have capability to cycle in a dwell state or short, long or combination thereof. Advanced transition mode that will ignore minimum pedestrian phase timings shall also be provided.		Desired				
15	**COORDINATION FEATURES (cont.) - The Local Controller Software shall provide**						
15.18	The offset be referenced (or be capable of being referenced) to the end of the green of the coordinated phase(s).		Desired				
15.19	Minimum pedestrian service time can exceed the split time for a phase.	Mandatory					
15.20	The Local Controller Software shall support a local Adaptive mode that adjusts splits based on Phase gap outs and max outs.		Desired				
16	**PREEMPTION FEATURES - The Local Controller Software shall provide**						
16.1	Minimum of ten prioritized preempts.	Mandatory					
16.2	Each Pre-emption input shall be programmable to have equal or higher priority.	Mandatory					
16.2.1	Equal priority preempts shall be served on a first called, first served basis	Mandatory					
16.2.2	Higher priority preempts shall override a lower priority preempt	Mandatory					
16.3	Each preempt must include two track clearance states, dwell state and exit state.	Mandatory					
16.4	Permit or allow the use of any phase/overlap for each preempt state.	Mandatory					
16.5	Per phase preempt timing (vehicle and pedestrian)	Mandatory					
16.6	Presence preempt input with optional fail-safe interlock input, Advanced Preempt Circuit capability.	Mandatory					
16.7	Utilize gate down input as part of Advanced Preempt Circuit to provide early termination of preempt feature, track clearance.	Mandatory					
16.8	Check-in/Check-out preempt detection option with override timer.	Mandatory					
16.9	Exit to programmed phase, next phase (phase following the active phase when preempt commenced), same phase (if phase was cut short at the start of preempt), or in-sync.	Mandatory					
16.10	Automatic yellow trap protection for all preemption sequences.	Mandatory					
16.11	Four soft preempts provided for step-by-step (special preempt sequence).	Mandatory					
16.12	Eight state per soft preempt sequence (timed or actuated).	Mandatory					
16.13	Each of the soft preempt states allows programmable calls, omits, hold and force-offs for each phase and overlap.	Mandatory					
16.14	The Local Controller shall provide user selectable entry and exit phases for each unique preempt input		Desired				
16.15	At the Conclusion of any preempt call, the Local Controller Software shall provide an exit transition timing and signal display to a programmed return-to-normal condition.		Desired				
16.16	All preempts inputs shall have priority over Automatic Flash.		Desired				
16.17	The Local Controller Software shall provide indications to identify the status of preempt operation. These indications shall include the following:		Desired				
16.17.1	Preempt Call		Desired				
16.17.2	Preempt in Control		Desired				
16.17.3	Preempt Interval		Desired				
16.17.4	Preempt Interval Counter		Desired				
16.18	During preemption operation, the overlaps should respect their parent phase programming unless specifically programmed to terminate during preemption.		Desired				

Category ID	*Requirement/Description*	*Mandatory*	*Desired*	*Currently Available*	*Available with Configuration*	*Cannot be Provided as Part of the Project*	*Comments*
17	**TRANSIT PRIORITY FEATURES - The Local Controller Software shall provide**						
17.1	Programmable transit priority options for each transit phase.	Mandatory					
17.2	Operates based on arrival times using local intersection detection and remote "peer-to-peer" combined with estimated delay from upstream intersections.	Mandatory					
17.3	Separate options for free or coordinated operation.	Mandatory					
17.3.1	Extend only (no phase abbreviation) or Early/Extend operation.	Mandatory					
17.3.2	Minimum phase green timing.	Mandatory					
17.3.3	Maximum extend limit.	Mandatory					
17.3.4	Optional vehicle/pedestrian phase omits.	Mandatory					
17.3.5	Alternate sequence switching.	Mandatory					
17.4	Adaptive arrival times to automatically compensate for varying station dwell times.	Mandatory					
18	**EMERGENCY VEHICLE PRIORITY - The Local Controller Software shall provide**						
18.1	Local Controller Software must support EVP field equipment (installed and maintained by various others).		Desired				
18.2	EVP field equipment is GPS based, no direct inputs to controller preemption		Desired				
18.3	All messaging must be passed directly to the controller via Ethernet (using a crossover cable if no Ethernet switch is present) and pass the Vehicle ID directly to the controller. No direct connection to preempt inputs is allowed.		Desired				
18.4	Raw inputs shall not be used in the detector racks.		Desired				
18.5	EVP Travel Time shall be reported and available on status screen away from the intersection (in seconds), minimum of eighty seconds advance notice required.		Desired				
18.6	EVP Vehicle ID shall visible from the controller front panel and in the controller logs		Desired				
18.7	Local Controller Software shall have the following available EVP inputs:		Desired				
18.7.1	A minimum of Minimum of four messages per direction, sixteen total.		Desired				
18.7.2	Two - Advance messages (four preferred).		Desired				
18.7.3	One – Left turn message (latched).		Desired				
18.7.4	One - Check-out message (active when vehicle is at the stop-bar).		Desired				
18.7.5	Each of the advance messages shall not activate until the specified travel time away from the intersection is reached.		Desired				
18.8	Local Controller Software shall provide input as default, "No Left Turn".		Desired				
18.8.1	Any required left turn request (per approach) must be logged.		Desired				
18.8.2	Left turn inputs shall be able to be "latched" call.		Desired				
18.8.3	Left turn signal shall only need to be on for minimum one second to latch.		Desired				
18.9	The natural controller sequence shall be preserved at all times. By default no phases are skipped and left-turn signals operate as normal unless requested by the emergency vehicle.		Desired				
18.10	No phase with demand shall be shortened to less than the alternate minimum green and the priority shall proportionally truncate all conflicting phases subject to this constraint.		Desired				
18.11	In the instance where phase truncation is necessary (with full vehicular demand on the conflicting movements), the controller shall not arrive on the service phase earlier than the specified travel time for that approach.		Desired				
18.12	Local Controller Software shall have at least four emergency vehicle priority modules (one per approach).	Mandatory					
18.12.1	Provides two-way communication between emergency / transit vehicles and the traffic signal to provide intelligent priority requests	Mandatory					
18.12.2	Interface to GPS equipment that provides travel time away, Vehicle ID and left-turn requests with the goal of maintaining arterial two-way progression	Mandatory					

Category ID	*Requirement/Description*	*Mandatory*	*Desired*	*Currently Available*	*Available with Configuration*	*Cannot be Provided as Part of the Project*	*Comments*
18	**EMERGENCY VEHICLE PRIORITY (cont.) - The Local Controller Software shall provide**						
18.13	Each module should consist of the following programming items:		Desired				
18.13.1	Primary service phase (thru phase) – activated by GPS advance message(s).		Desired				
18.13.2	Secondary service phase (left turn phase) – activated by GPS left-turn message.		Desired				
18.13.3	Flags with the ability to omit phases or pedestrian movements as necessary for each of the priority modules (no omits by default).		Desired				
18.13.4	Travel time parameter for the primary service phase (thru-phase) where the specified movement shall be green by the time the vehicle is that distance away.		Desired				
18.13.5	Any conflicting walk rest shall be terminated once a conflicting emergency vehicle request is recognized by the controller.		Desired				
18.13.6	On a coordinated street the opposing direction walk rest shall be terminated only if a conflicting secondary service phase is programmed.		Desired				
18.13.7	Any walk rest parallel to the emergency vehicle shall rest as normal.		Desired				
18.13.8	Travel time parameter for the secondary service phase (left-turn-phase) where the specified movement shall be green by the time the vehicle is that distance away.		Desired				
18.13.9	Check out input – activated by GPS check-out message.		Desired				
18.13.10	Maximum presence timer where the priority is ignored until the call is dropped.		Desired				
18.14	A conflicting emergency vehicle priority request on the cross street shall be able to force-off the coordinated phases early in order to serve the green by the specified travel time.		Desired				
18.15	Local Controller Software shall have mechanism in place to prevent acceptance of increasing travel times from the GPS unit if the emergency vehicle were to encounter reduced speeds.		Desired				
18.16	All phases shall have an alternate priority minimum green (typically greater than the normal minimum green) that will apply if there is demand for a particular phase.		Desired				
18.17	Upon check-out the Local Controller Software shall immediately move onto the next phase if the priority is timing beyond the normal force-off point, subject to the alternate minimum green.		Desired				
18.18	Local Controller Software shall log all priority requests and left-turn requests, including Vehicle IDs.		Desired				
19	**STATUS/DIAGNOSTIC FEATURES - The Local Controller Software shall provide**						
19.1	A multitude of detailed controller status displays shall be available through the front panel display of the 2070 Controller.	Mandatory					
19.2	At a minimum, the following status screens shall be user selectable:	Mandatory					
19.2.1	Phase, ring and overlap status.	Mandatory					
19.2.2	Transit phase/priority status.	Mandatory					
19.2.3	Coordination status.	Mandatory					
19.2.4	Preemption status.	Mandatory					
19.2.5	Vehicle and Pedestrian detector status.	Mandatory					
19.2.6	Transit priority status.	Mandatory					
19.2.7	Cabinet/Field/ I/O Status.	Mandatory					
19.2.8	System communication status.	Mandatory					
19.2.9	Current active software version and intersection street names.	Mandatory					
19.3	A minimum of six-thousand controller event log shall be provided.	Mandatory					
19.3.1	Multiple classes of events can be individually enabled for logging.	Mandatory					
19.3.2	Logs can be retrieved and/or reset from ATMS connection (serial or IP), or from front panel.	Mandatory					

Category ID	*Requirement/Description*	*Mandatory*	*Desired*	*Currently Available*	*Available with Configuration*	*Cannot be Provided as Part of the Project*	*Comments*
19.4	A minimum sixty days logging of volume/occupancy for sixteen detectors at fifteen minute intervals.	Mandatory					
19	**STATUS/DIAGNOSTIC FEATURES (cont.) - The Local Controller Software shall provide**						
19.5	A minimum six-hundred CMU/MMU time-stamped event log shall be accessible, that will include reason for failure and status of all the field outputs at time of fault.	Mandatory					
19.6	All changes to the database should be time-stamped		Desired				
19.7	The Local Controller Software shall provide controller logs containing the following minimum information		Desired				
19.7.1	Critical Response Frame Errors		Desired				
19.7.2	Non-critical Response Frame Errors		Desired				
19.7.3	Detector Errors		Desired				
19.7.4	Local Flash Faults		Desired				
19.7.5	Preempt		Desired				
19.7.6	Power On/Off		Desired				
19.7.7	Coordination transition		Desired				
19.7.8	Coordination errors		Desired				
19.7.9	Priority status		Desired				
20	**CONTROLLER LOGIC REQUIREMENTS - The Local Controller Software shall provide**						
20.1	At a minimum the following logic descriptions and functions must be provided as primary I/O logic requirements (OR, AND, NOT, NOR & NAND).	Mandatory					
20.2	All available "timed" parameters and status indicators for phases and overlaps should be able to used in the definition of logic statements.		Desired				
20.3	Logic statements shall be evaluated prior to the controller taking action directly based on an input.		Desired				
20.4	64 cabinet logic channels to accomplish custom controller I/O operation.	Mandatory					
21	**PEER to PEER LOGIC**						
21.1	Local Controller Software must allow selected input and output functions from remote intersections to trigger an output function at the local intersection. Remote inputs and outputs will be received over the Ethernet port (ETH0) of the controller. Each peer channel shall perform Boolean logic on up to two remote input/output functions with an optional delay to trigger the peer logic channel and therefore assert the selected local output function. Local Controller Software will provide a minimum of 16 peer logic channels.	Mandatory					
22	**OUTPUTS/INPUTS**						
22.1	All controller input and output functions can be mapped to any physical cabinet input and output for each of the supported cabinet types	Mandatory					
22.2	The Local Controller Software shall provide, via program entry, the following outputs:	Mandatory					
22.2.1	Load Switch Drivers for Vehicle Phase – This output shall provide a Green, Yellow, and Red output for each vehicle phase.	Mandatory					
22.2.2	Load Switch Drivers for Pedestrian Phase – This output shall provide a Walk, Pedestrian Clearance, and Don't Walk output for each pedestrian movement.	Mandatory					
22.2.3	Check – This output shall indicate phase or vehicle phase call status		Desired				
22.2.4	Phase On – This output indicates phase status		Desired				
22.2.5	Phase Next – This output indicates the next committed phase.		Desired				

Category ID	*Requirement/Description*	*Mandatory*	*Desired*	*Currently Available*	*Available with Configuration*	*Cannot be Provided as Part of the Project*	*Comments*
22	**OUTPUTS/INPUTS (cont.)**						
22.3	The Local Controller Software shall provide the following inputs on a per ring basis:		Desired				
22.3.1	Force Off in actuated mode terminates the Green timing of the active phase		Desired				
22.3.2	Force Off in nonactuated mode terminates the Walk Hold of the active phase		Desired				
22.3.3	Red Rest requires rest in Red of all phases in the timing ring		Desired				
22.3.3.1	Registration of a serviceable conflicting call shall result in immediate advance for Red Rest to Green on the demanding phase		Desired				
22.3.4	Inhibit Maximum Termination – disables the maximum termination functions of all phases in the selected timing ring.		Desired				
22.3.4.1	Inhibit Maximum Termination does not inhibit timing of maximum green		Desired				
22.3.5	Omit Red Clearance – Omits the Red Clearance interval timings		Desired				
22.3.6	Pedestrian Recycle – This input controls the recycling of pedestrian movements based on the operating mode		Desired				
22.3.6.1	In actuated mode, the pedestrian movement shall be recycled if the pedestrian recycle input is active on the phase, a serviceable pedestrian call exists, and the hold input is active.		Desired				
22.3.6.2	In non-actuated mode, the pedestrian movement is recycled if the pedestrian recycle input is active on the phase, the Pedestrian Omit is not active, and a serviceable conflicting call does not exist.		Desired				
22.3.7	Maximum II Selection – Allows the selection of the maximum II time on all phases in the selected ring		Desired				
22.3.8	Maximum III Selection – Allows the selection of the maximum III time on all phases in the selected ring		Desired				
22.4	The Local Controller Software shall provide the following outputs on a per ring basis:		Desired				
22.4.1	The active phase is in its Green interval and operating in Actuated Mode		Desired				
22.4.1.1	Minimum Timing – When timing in the Initial, Walk, or Pedestrian Clearance portions of the Green interval		Desired				
22.4.1.2	Extension Timing – When timing that portion of the Green interval following the completion of the minimum timings		Desired				
22.4.1.3	Maximum timing – When timing that portion of the Green interval following the completion of the minimum timings, when not timing an extension and the maximum Green is timing		Desired				
22.4.1.4	Green Rest – When timing that portion of the Green interval when the minimum timings are complete, Passage Timer is timed out and the Maximum Green timer is either timed out or has not started		Desired				
22.4.2	The active phase is in its Green interval and operating in nonactuated Mode		Desired				
22.4.2.1	Walk Timing – When timing in the Walk portion of the Green interval		Desired				
22.4.2.2	Walk Hold – When the output is active, Walk timing is complete and the Hold input is active		Desired				
22.4.2.3	Pedestrian Clearance Timing – When timing the Pedestrian Clearance interval or the remaining portion of the Minimum Green		Desired				
22.4.2.4	Green Rest – When the timing of the Pedestrian and Minimum Green are complete		Desired				
22.4.3	The Active Phase is not in its Green interval		Desired				
22.4.3.1	Yellow Change – When timing the Yellow Change		Desired				
22.4.3.2	Red Clearance – When timing the Red Clearance		Desired				
22.4.3.3	Red Rest – When timing is complete and a Red indication is displayed		Desired				
22.5	The Local Controller Software shall have the ability to utilize an alternate Yellow and All Red paramter based on an external input.		Desired				

Category ID	*Requirement/Description*	*Mandatory*	*Desired*	*Currently Available*	*Available with Configuration*	*Cannot be Provided as Part of the Project*	*Comments*
22	**OUTPUTS/INPUTS (cont.)**						
22.6	The Local Controller Software shall provide the following inputs, via program input, to each phase:		Desired				
22.6.1	Hold – The hold input shall retain the Green indication on the selected phase.		Desired				
22.6.1.1	Hold on a nonactuated phase		Desired				
22.6.1.2	Hold on an actuated phase		Desired				
22.6.2	Phase Omit - The Phase Omit input shall cause the omission of a phase	Mandatory					
22.6.3	Pedestrian Omit – The Pedestrian Omit input shall inhibit the selection of a phase due to a pedestrian call on that phase and to prohibit the servicing of a pedestrian call on that phase.	Mandatory					
22.6.4	Maximum II Selection – Allows the selection of the maximum II time per phase		Desired				
22.6.5	Maximum III Selection – Allows the selection of the maximum II time per phase		Desired				
23	**INITIALIZATION**						
23.1	The Local Controller Software shall provide the following features on a Per Unit basis:	Mandatory					
23.2	Initialization - Initialization shall occur after either of the following conditions:	Mandatory					
23.2.1	Restoration of power after a defined power interruption	Mandatory					
23.2.2	Activation of an External Start input	Mandatory					
23.3	The Local Controller Software shall provide a program entry for initialization to allow define initialization start-up at the beginning of the Green, Yellow, or Red interval of any phase or nonconflicting phase pair	Mandatory					
23.4	Upon start up, software shall automatically go into time-of-day/day-of-week mode, and shall operate using the current timing plan called for in the time-of-day schedule. No intervention shall be required to operate according to the schedule. If at any time the clock is updated, whether through the keyboard or by means of the central software or portable computer, and the new time corresponds to a different timing plan, the controller shall begin to operate the new timing plan automatically.	Mandatory					
24	**ALTERNATE SEQUENCE**						
24.1	Alternate Sequence – The Local Controller Software shall provide fifteen alternatives to the standard sequence		Desired				
24.2	The alternate sequences shall provide every combination of lead-lag operation for an eight phase Dual Ring configuration.		Desired				
24.3	The Alternate sequence shall be user definable	Mandatory					
24.4	The Alternative Sequence shall be selectable by Timing Plan	Mandatory					
24.5	It shall be possible to define any phase as restricted from operating concurrently with any other phase with which it would otherwise be able to operate concurrently without the use of logic programming.	Mandatory					
24.6	The Local Controller Software shall allow programming of Uneven Double Cycling	Mandatory					
24.7	The Local Controller Software shall allow programming to serve certain or all phases of an intersection twice within the corridor's background cycle.	Mandatory					
24.7.1	The split time for first and second service shall be separately defined.	Mandatory					
24.7.2	Phases can be omitted from either the first or second service.	Mandatory					
24.8	The Local Controller Software shall allow programming of twice-per-cycle servicing of left turns	Mandatory					
24.8.1	Each left turn service should have a split time that is separately defined.		Desired				
24.8.2	Twice-per-cycle servicing of left turns shall be able to be implemented by time-of-day		Desired				
24.8.3	Twice-per-cycle servicing of left turns shall be demand driven using vehicle detectors		Desired				

Appendix A
Local Controller Software Requirements Compliance Matrix

Category ID	*Requirement/Description*	*Mandatory*	*Desired*	*Currently Available*	*Available with Configuration*	*Cannot be Provided as Part of the Project*	*Comments*
25	**SPECIAL FUNCTIONS**						
25.1	The Local Controller Software shall provide a minimum of 16 special functions	Mandatory					
25.2	Each special function shall be controllable from the central control	Mandatory					
25.3	Each special function shall be controllable from the local time-of-day schedule	Mandatory					
25.4	Each special function shall be controllable for the special function inputs	Mandatory					
25.5	Each special function shall be programmable per plan and pattern	Mandatory					
26	**SAFEGUARDS**						
26.1	Local Controller Software shall include safeguards to preclude dangerous or undesirable intersection operation.		Desired				
26.2	These safeguards shall, as a minimum, include range checking, and coordinated timing plan diagnostics for each pattern/split combination.		Desired				
26.3	At a minimum, timing plan diagnostics shall check for the following:		Desired				
26.3.1	Split times which violate minimum phase lengths (minimum green + yellow + all red)		Desired				
26.3.2	Split times which violate pedestrian times (walk + flashing don't walk + yellow + all red)		Desired				
26.3.3	Split times which do not add up to cycle length		Desired				
26.3.4	Split times which cause barriers to not be aligned.		Desired				
26.4	The diagnostics shall check for split time violations which occur during short way correction mode as well as those which occur during the programmed cycle length for a given coordination pattern.		Desired				
26.5	Checking for splits which violate pedestrian times shall not prevent the use of vehicular splits which are less than the pedestrian times		Desired				
26.6	When errors occur, the results shall be displayed clearly and concisely with information sufficient for timely correction by the operator		Desired				
26.7	If there are no errors, the controller shall service all serviceable phases and pedestrian movements with calls during every cycle. This shall occur regardless of whether or not the controller is in transition from one offset to another. The controller shall service every serviceable phase even while in transition from one phase sequence to another, and while leaving pre-emption.		Desired				
27	**OPERATIONS**						
27.1	The Local Controller Software shall be capable of providing internal Time Base Control, via program entry	Mandatory					
27.2	The Local Controller Software shall be capable of being set to manually operate in a selected timing plan, via program entry	Mandatory					
27.3	The Local Controller Software shall be capable of operating in Free Mode	Mandatory					
27.4	The Local Controller Software shall allow Start-up Flash Operation	Mandatory					
27.4.1	The duration of start-up flash shall be programmable for 0-255 seconds in one second increments	Mandatory					
27.5	The Local Controller Software shall provide Automatic Flash Operation	Mandatory					
27.5.1	The Entry phases to Automatic Flash shall be selectable, via program entry		Desired				
27.5.2	The Exit phases from Automatic Flash shall be selectable, via program entry	Mandatory					
27.5.3	When exiting Automatic Flash, calls shall be placed on all vehicle and pedestrian movements		Desired				
27.6	Users shall be capable of setting date and time settings in the Local Controller Software.	Mandatory					
27.6.1	The Local Controller Software shall be capable of automatically adjusting for Daylight Savings Time using programmed month/week.	Mandatory					
27.7	The Local Controller Software shall allow selection of timing plans on a time-of-day/day-of-week basis	Mandatory					
27.7.1	The Local Controller Software shall allow up to 40 weekly time-of-day schedules	Mandatory					
27.8	The Local Controller Software shall be capable of scheduling fixed holidays	Mandatory					
27	**OPERATIONS (cont.)**						
27.9	The Local Controller Software shall be capable of scheduling floating holidays	Mandatory					

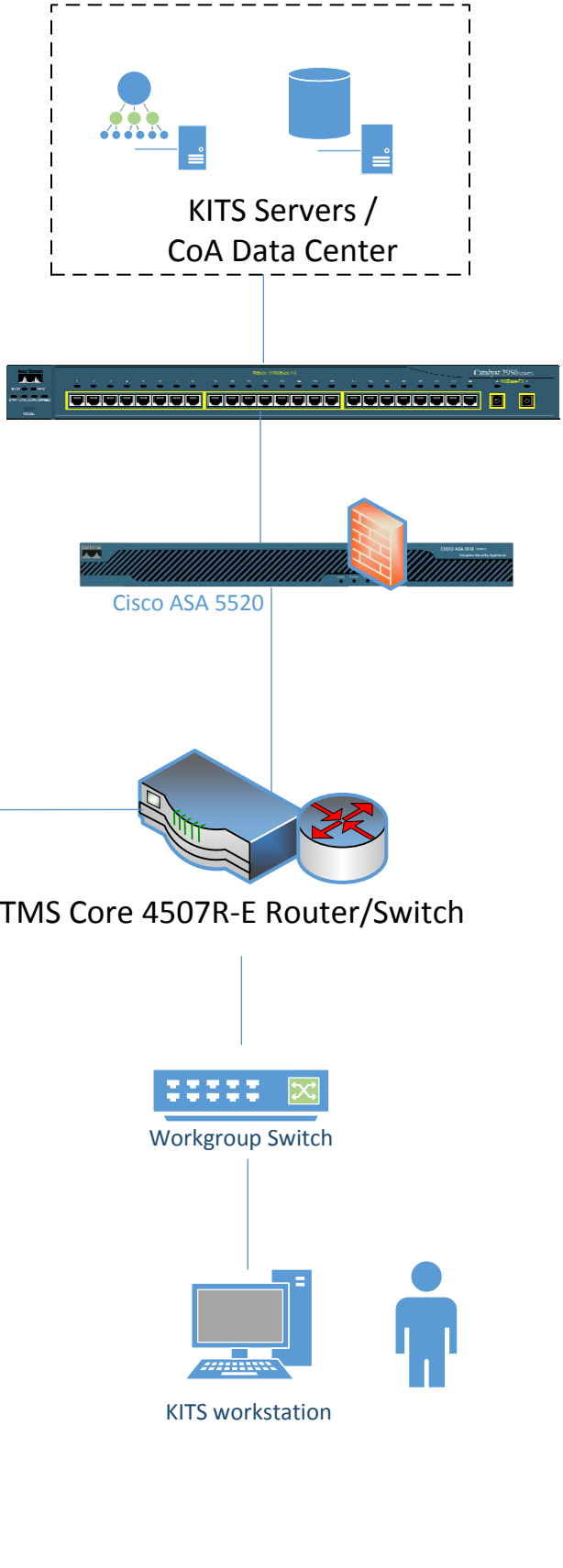
Category ID	*Requirement/Description*	*Mandatory*	*Desired*	*Currently Available*	*Available with Configuration*	*Cannot be Provided as Part of the Project*	*Comments*
27.9.1	Floating holidays shall be able to be defined by the occurrence of the specific day within the month (for example 4th Friday in November not Friday during the 4th week in November).	Mandatory					
27.10	The Local Controller Software shall be capable of scheduling different seasons of the year. This would enable the calling of different schedules/timing plans during a particular season. (For example a school year.)	Mandatory					
27.10.1	Seasons should be specified by indicating the start and end dates for each season	Mandatory					
27.10.2	If a specific season is not specified for a given day then the day schedule for the default season should be run		Desired				
28	**SPECIAL DEVICES**						
28.1	The Local Controller Software shall be capable of operating Changeable Lane Assignment Signs (CLAS). This functionality can be direct, or by means of making active specific controller outputs.		Desired				
28.1.1	The operation of the CLAS shall be assignable by Time-of-Day and by plan.		Desired				
28.1.2	CLAS operation shall include clearance intervals to allow safe change from one assignment to another		Desired				
28.1.3	CLAS shall have continuous on/off control from the Local Controller Software		Desired				
28.2	The Local Controller Software shall be capable of operating active “No Right Turn” or “No Left Turn” signs at railroad crossings		Desired				
28.3	The Local Controller Software shall be capable of collecting data from external sources including Bluetooth and Wi-Fi		Desired				
28.4	There will be adequate diagnostics to troubleshoot any possible problems.		Desired				
28.5	There will be a log file to review historical events.		Desired				
28.6	The Local Controller Software shall provide NMEA 0183 support for any compliant GPS device (date and time set)	Mandatory					
29	**COMMUNICATIONS**						
29.1	The Local Controller Software shall be capable of communicating using TCP/IP Ethernet Standard Protocol	Mandatory					
29.1.1	The Local Controller shall allow the following Ethernet Settings:	Mandatory					
29.1.1.1	IP Address	Mandatory					
29.1.1.2	Subnet Mask	Mandatory					
29.1.1.3	Broadcast Address	Mandatory					
29.1.1.4	DHCP enable	Mandatory					
29.2	The Local Controller Software shall allow remote ping to verify communication in an IP network.		Desired				
29.3	High data traffic or network storms should not impact the operation of the Location Controller or cause the intersection to go into flash.	Mandatory					
29.3.1	A loss of communication for a period of time to a Local Controller should not prevent that Local Controller from resuming communication (all functions) once communication is restored.	Mandatory					
29.3.2	A delay in communication due to high network latency for a period of time to a Local Controller should not prevent that Local Controller from operating normally.	Mandatory					
29.4	The Local Controller Software shall have the ability to communicate with detector equipment via the SDLC interface when installed in a 332 or 336 cabinet		Desired				
29.5	The Local Controller Software shall support the triggering of all preempts from an external source via the ethernet port.		Desired				

Category ID	*Requirement/Description*	*Mandatory*	*Desired*	*Currently Available*	*Available with Configuration*	*Cannot be Provided as Part of the Project*	*Comments*
29	**COMMUNICATIONS (cont.)**						
29.6	The Local Controller Software shall support the triggering of all transit priority features from an external source via the ethernet port.		Desired				
29.7	The Local Controller Software shall have the ability to receive every input via the ethernet port.		Desired				
29.8	The Local Controller Software shall provide buffering capability of all data so that a temporary loss in communication does not result in a loss of real-time data being sent to central.	Mandatory					

Network Diagram

City of Austin
Austin Transportation Department
Traffic Management Center
12-12-16

Note: The information shown here is for informational purposes only.



ADDENDUM
CITY OF AUSTIN, TEXAS

Solicitation: RFPJTH0309 Addendum No: 1 Date of Addendum: 1/20/17

This addendum is to incorporate the following changes to the above referenced solicitation:

I. Clarifications:

1. Preproposal conference call in line is as stated in the RFP:

   CONFERENCE CALL IN LINE: (512)974-9300 Participant code: 521387

2. A Web-ex has been set up for this preproposal conference and the link is:

   https://meetings.webex.com/collabs/#/meetings/detail?uuid=MBZZ5W27IK1VE8M8Y13TTB5V WT-ABG5&rnd=387972.43607

   Do not use the WebEx conference call in line. Use the conference line provided with the RFP.

II. Questions:

1. Q) May companies from outside of the USA apply for this work (ie, India or Canada)?

   A) Yes.

2. Q) Do vendors need to come to Austin, Texas for meetings?

   A) Yes. We will require interaction face to face during initial "development/configuration" discussions and for training and hardware installation. We would also expect on site assistance during data migration and system implementation. Other meetings can be done remotely with the expectation they occur during normal business hours, Monday-Friday, US Central Standard time.

3. Q) Can the vendor perform the tasks (related to the RFP) outside of the USA (ie, from India or Canada)?

   A) As stated above.

4. Q) Can the vendor submit proposals by email?

   A) No the City does not accept proposals by email.

4. Q) Do you have a deadline date for questions set yet? If so, what is that date?

A) The deadline for all clarification questions is no later than 5:00 PM CST on February 2, 2017.

III. **ALL OTHER TERMS AND CONDITIONS REMAIN THE SAME.**

APPROVED BY: _____ 1/20/17__
James T. Howard, Corporate Purchasing Manager Date
Purchasing Office, 512-974-2031

ACKNOWLEDGED BY:

_____ _____ _____
Name Authorized Signature Date

RETURN ONE COPY OF THIS ADDENDUM TO THE PURCHASING OFFICE, CITY OF AUSTIN, WITH YOUR RESPONSE OR PRIOR TO THE SOLICIATION CLOSING DATE. FAILURE TO DO SO MAY CONSTITUTE GROUNDS FOR REJECTION.

ADDENDUM
CITY OF AUSTIN, TEXAS

Solicitation: RFPJTH0309 Addendum No: 2 Date of Addendum: 2/3/2017

This addendum is to incorporate the following changes to the above referenced solicitation:

I. Clarifications:

1. **Proposal Due Date has been extended to 2/16/2017 at 2:00 P.M.**

2. **Attached is a SMBR Prebid Meeting Handout. Please review.**

II. Questions:

5. Q) What is considered the start of the warranty? When shipped? When installed in the field? Need clarification as those are two different conditions.

   A) Warranty must exist 24 months from the date of "shipment."

III. **ALL OTHER TERMS AND CONDITIONS REMAIN THE SAME.**

APPROVED BY: _____ 2/3/2017
James T. Howard, Corporate Purchasing Manager Date
Purchasing Office, 512-974-2031

ACKNOWLEDGED BY:

_____ _____ _____
Name Authorized Signature Date

RETURN ONE COPY OF THIS ADDENDUM TO THE PURCHASING OFFICE, CITY OF AUSTIN, WITH YOUR RESPONSE OR PRIOR TO THE SOLICIATION CLOSING DATE. FAILURE TO DO SO MAY CONSTITUTE GROUNDS FOR REJECTION.

PROPOSAL

Traffic Management Software

Solicitation No. RFP JTH0309

February 2017

February 16, 2017

Attn: Jim Howard, Corporate Purchasing Manager
Municipal Building, 124 W 8th Street RM 308
Austin, TX 78701

RE: RFP JTH0309 – Traffic Management Software

Dear Mr. Howard and Evaluation Committee:

On behalf of Advanced Traffic Solutions, LLC, we are pleased to submit this offer to provide local control software, hardware, and related services in response to RFP JTH0309. The D4 traffic signal controller firmware proposed for this offer is a powerful yet intuitive package that exceeds many of the requirements in this RFP.

The D4 software is developed by Advanced Traffic Solutions, LLC a Texas owned and operated firm that specializes in software development, traffic engineering and Intelligent Transportation Systems (ITS). This project has much in common with work we have successfully completed in numerous jurisdictions throughout North America. The D4 is presently deployed at more than 5,000 traffic signals and 15 agencies across the country.

Advanced Traffic Solutions, LLC has an existing working relationship with Kimley-Horn & Associates and have successfully integrated D4 with KITS on other projects across the United States and Canada. This established relationship will ensure the continued seamless integration of D4 with the existing KITS central systems presently deployed in the City of Austin and City of San Antonio.

The D4 was built around transit and is well suited for this project. Many of the advanced features that are desired in this RFP are built right into the software. This includes advanced transit priority features, built-in support for pedestrian hybrid beacons, and support of GPS and central system based emergency vehicle preemption / priority.

As President of Advanced Traffic Solutions, LLC, I, Eric J. Nelson, P.E. will serve as your primary contact for all technical, pricing and contractual questions. Please feel free to contact me at (832) 405-8577 or eric@advtraffic.com.

Sincerely,

Eric J Nelson

Eric J. Nelson, P.E.
President
Advanced Traffic Solutions, LLC

3505 Sage Road, Suite 2309, Houston, TX 77056-7182
Tel: (832) 405-8577 | Fax: (713) 871-9639
www.advtraffic.com

Tab B. Executive Summary

Advanced Traffic Solutions, LLC is pleased to propose the D4 traffic signal controller software for this proposal for the City of Austin's Local Traffic Signal Controller Software RFP JTH0309. We support many advanced coordination modes, preemption and transit priority features that are unavailable in other controllers. We are a Houston, TX based company with experienced engineers and software developers with a proven history of delivering successful projects within budget and on schedule.

The D4 firmware was first deployed in 2003 in the City of San Francisco, CA. Due to this heritage, the D4 firmware is particularly strong in transit signal priority applications and we are confident that the priority functionality currently in use in Austin and San Antonio will be more flexible with this firmware. This project is more than just deploying software; it is about improving the mobility of the transportation system which our advanced tools help achieve.

The D4 supports multiple open hardware platforms including OS-9 and Linux based 2070's / NEMA ATC controllers. Most other software vendors tend to develop software that is only 100% functional on their controller hardware. Given that we are a software only provider we have been able to bridge this gap by providing user specific software that is streamlined across all OS-9 and Linux ATC platforms thereby providing agencies the flexibility to mix and match controller hardware. A D4 update or enhancement for one controller type is immediately reflected in each build for every ATC controller that we support. In addition all of our databases are forward and backward compatible, meaning that any version of our supporting editors or utilities will continue to work with the product.

The D4 supports all cabinet types in use by the City of Austin, including the ITS cabinet where we have more deployments in this cabinet type than any other vendor. We also recently added support for the ATC cabinet and already have 6 field deployments in various agencies across the country. This includes the high voltage and low voltage versions of the ATC cabinet in both the 16 and 32 channel configurations. Unlike our competitors, the D4 also does independent validation of the conflict monitor programming in TS-2, ITS and ATC cabinets, thereby alerting the user of any permissives in the conflict monitor that are over jumpered based on current controller programming.

The majority of functionality requested by this RFP is already supported in our current version. The remaining items will be provided as part of this project and are summarized in the table on the next page. The D4 firmware currently meets the majority of the desired and mandatory requirements for this RFP. Some software development will be required to deliver all required features but this is minor enough that we are envisioning a 4-month window after receiving the notice to proceed to implement the remaining features.

All mandatory requirements will be provided for this project. There are two features (both desired) that will require further discussion and clarification from the City. Category 28.3 regards Bluetooth and Wi-Fi data collection. More information is required about the data collection devices and the system that this data would be integrated into to estimate the required development effort. Category 1.11 regards web based data entry and modification. There are challenges to providing a web server that will run on the controller while maintaining support for all of the hardware platforms requested in this RFP. We presently support status only via the web. We also support entry and modification of data through telnet without the need for a database editor. Additionally, it would be difficult to support all of the advanced functionality

available in our database editor on a web platform therefore we are proposing to provide a desktop version of the database editor and access to the controller via telnet.

The following items are not supported in the current version of software but will be developed (items 1.17 and 29.1.1.4 may require coordination with the central system provider):

Category	Brief Description of Requirement	Mandatory/Desired
1.17	Request upload to central system from front panel	Desired
10.19 / 12.6	Timeout value for front panel calls	Desired / Mandatory
22.5	Alternate all red parameter	Desired
27.7.1	40 Weekly Time-of-Day Schedules	Mandatory
29.1.1.4	DHCP Enable	Mandatory

The D4 contains several notable items that are not required by the RFP:

- Advanced transit, transit priority and peer-to-peer functionality
- Multiple coordination and pedestrian permissive modes
- Front panel access through connected device
- Automatic yellow-trap protection, including during pre-empt
- Floating force-offs with float green parameter

Many of the requirements of this RFP are features that were first implemented in the D4 before any other controller. They have been running successfully in the field for many years and they are not simply being implemented for this or other recent RFPs. Features pioneered in the D4 software and now becoming more standard requirements include:

- Transit Phases
- Adaptive Priority
- Emergency Vehicle Priority
- Different detection modes for Flashing Yellow Arrow
- Built-in support for the Pedestrian Hybrid Beacon (using multiple modes)
- Phase next decision during phase clearance

The D4 controller also supports the Indiana Hi-Resolution Data Logger that provides the data to produce Advanced Traffic Signal Performance Measures (ATSPM) such as the Purdue Coordination, Phase Termination and Split Failure diagram. The D4 controller also supports connected vehicles (additional optional feature) where we have done extensive work in the to bring this new technology to the marketplace.

We have an existing working relationship with Kimley-Horn & Associates and have successfully integrated D4 with KITS on other projects across the United States and Canada. This established relationship will ensure the continued seamless integration of D4 with the existing KITS central systems presently deployed in the City of Austin and City of San Antonio.

In summary, our team has the framework in place, knowledge necessary and proven track record to rapidly and effectively implement the remainder of the requirements. We pride ourselves on staying responsive and meeting the custom software demands of our clients. Given our exclusive focus on the firmware, and support of multiple hardware and central systems, we provide unparalleled value for the local firmware with regards to openness and flexibility. We know both sides would benefit greatly from this relationship and look forward to adding cities of Austin and San Antonio to our growing list of satisfied customers.

Tab C. City of Austin Purchasing Documents

a. Completed and Signed Offer Sheet (pages 1-3)

b. Signed Addendums (all pages)

c. Completed Section 0605 – Local Business Presence Identification Form

d. Completed Section 0700 – Reference Sheet

e. Completed and Signed Section 0800 – Non-Discrimination Certification

f. Completed Section 0815 – Living Wages Contractor Certification

g. Completed Section 0835 – Non-Resident Bidder Provisions

h. Completed and Signed Section 0900 (first and second page) – Minority- and Women-Owned Business Enterprise (MBE/WBE) No Goals Form

i. Completed Section 301 – Purchasing Exceptions Form

CITY OF AUSTIN, TEXAS

Purchasing Office

REQUEST FOR PROPOSAL (RFP)

OFFER SHEET

SOLICITATION NO: RFP JTH0309

DATE ISSUED: 1/9/2017

COMMODITY CODE: 92032

COMMODITY/SERVICE DESCRIPTION: Traffic Management Software

PRE-PROPOSAL CONFERENCE TIME AND DATE: 01/25/2017 11:00 A.M.

LOCATION: 1501 Toomey Road, Austin, Texas 78704
CONFERENCE CALL IN LINE: (512) 974-9300 Participant Code: 521387

FOR CONTRACTUAL AND TECHNICAL ISSUES CONTACT THE FOLLOWING AUTHORIZED CONTACT PERSON:

Jim Howard
Corporate Purchasing Manager

Phone: (512) 974-2031
E-Mail: jim.howard@austintexas.gov

PROPOSAL DUE PRIOR TO: 02/9/2017 2:00 P.M.

PROPOSAL CLOSING TIME AND DATE: 02/9/2017 2:15 P.M.

LOCATION: MUNICIPAL BUILDING, 124 W 8th STREET RM 308, AUSTIN, TEXAS 78701

LIVE SOLICITATION CLOSING ONLINE: For RFP's, only the names of respondents will be read aloud

For information on how to attend the Solicitation Closing online, please select this link:

http://www.austintexas.gov/department/bid-opening-webinars

When submitting a sealed Offer and/or Compliance Plan, use the proper address for the type of service desired, as shown below:

Address for US Mail (Only)	Address for Fedex, UPS, Hand Delivery or Courier Service
City of Austin	City of Austin, Municipal Building
Purchasing Office-Response Enclosed for Solicitation # JTH0309	Purchasing Office-Response Enclosed for Solicitation # JTH0309
P.O. Box 1088	124 W 8th Street, Rm 308
Austin, Texas 78767-8845	Austin, Texas 78701
	Reception Phone: (512) 974-2500

NOTE: Offers must be received and time stamped in the Purchasing Office prior to the Due Date and Time. It is the responsibility of the Offeror to ensure that their Offer arrives at the receptionist's desk in the Purchasing Office prior to the time and date indicated. Arrival at the City's mailroom, mail terminal, or post office box will not constitute the Offer arriving on time. See Section 0200 for additional solicitation instructions.

All Offers (including Compliance Plans) that are not submitted in a sealed envelope or container will not be considered.

SUBMIT 1 ORIGINAL, AND 10 ELECTRONIC COPIES (FLASH DRIVE) OF YOUR RESPONSE

*****SIGNATURE FOR SUBMITTAL REQUIRED ON PAGE 3 OF THIS DOCUMENT*****

This solicitation is comprised of the following required sections. Please ensure to carefully read each section including those incorporated by reference. By signing this document, you are agreeing to all the items contained herein and will be bound to all terms.

SECTION NO.	TITLE	PAGES
0100	STANDARD PURCHASE DEFINITIONS	*
0200	STANDARD SOLICITATION INSTRUCTIONS	*
0300	STANDARD PURCHASE TERMS AND CONDITIONS	*
0400	SUPPLEMENTAL PURCHASE PROVISIONS	12
0500	SCOPE OF WORK	7
0600	PROPOSAL PREPARATION INSTRUCTIONS & EVALUATION FACTORS	5
0601	PRICING SHEET	1
0605	LOCAL BUSINESS PRESENCE IDENTIFICATION FORM – Complete and return	2
0700	REFERENCE SHEET – Complete and return if required	2
0800	NON-DISCRIMINATION CERTIFICATION	3
0805	NON-SUSPENSION OR DEBARMENT CERTIFICATION	*
0810	NON-COLLUSION, NON-CONFLICT OF INTEREST, AND ANTI-LOBBYING CERTIFICATION	*
0815	LIVING WAGES CONTRACTOR CERTIFICATION–Complete and return	1
0835	NONRESIDENT BIDDER PROVISIONS – Complete and return	1
0900	MBE/WBE PROCUREMENT PROGRAM PACKAGE NO GOALS FORM – Complete & return	2

*** Documents are hereby incorporated into this Solicitation by reference, with the same force and effect as if they were incorporated in full text. The full text versions of the * Sections are available on the Internet at the following online address:**

http://www.austintexas.gov/financeonline/vendor_connection/index.cfm#STANDARDBIDDOCUMENTS

If you do not have access to the Internet, you may obtain a copy of these Sections from the City of Austin Purchasing Office located in the Municipal Building, 124 West 8th Street, Room #308 Austin, Texas 78701; phone (512) 974-2500. Please have the Solicitation number available so that the staff can select the proper documents. These documents can be mailed, expressed mailed, or faxed to you.

INTERESTED PARTIES DISCLOSURE

In addition, Section 2252.908 of the Texas Government Code requires the successful offeror to complete a Form 1295 "Certificate of Interested Parties" that is signed and notarized for a contract award requiring council authorization. The "Certificate of Interested Parties" form must be completed on the Texas Ethics Commission website, printed, signed and submitted to the City by the authorized agent of the Business Entity with acknowledgment that disclosure is made under oath and under penalty of perjury prior to final contract execution.

https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm

The undersigned, by his/her signature, represents that he/she is submitting a binding offer and is authorized to bind the respondent to fully comply with the solicitation document contained herein. The Respondent, by submitting and signing below, acknowledges that he/she has received and read the entire document packet sections defined above including all documents incorporated by reference, and agrees to be bound by the terms therein.

Company Name: Advanced Traffic Solutions, LLC

Company Address: 3505 Sage Road, Suite 2309

City, State, Zip: Houston, TX 77056-7182

Federal Tax ID No.

Printed Name of Officer or Authorized Representative: Eric J. Nelson, P.E.

Title: President

Signature of Officer or Authorized Representative: Eric J Nelson

Date: 02/16/17

Email Address: eric@advtraffic.com

Phone Number: (832) 405-8577

*** Proposal response must be submitted with this Offer sheet to be considered for award**

ADDENDUM
CITY OF AUSTIN, TEXAS

Solicitation: RFPJTH0309 Addendum No: 1 Date of Addendum: 1/20/17

This addendum is to incorporate the following changes to the above referenced solicitation:

I. Clarifications:

1. Preproposal conference call in line is as stated in the RFP:

   CONFERENCE CALL IN LINE: (512)974-9300 Participant code: 521387

2. A Web-ex has been set up for this preproposal conference and the link is:

   https://meetings.webex.com/collabs/#/meetings/detail?uuid=MBZZ5W27IK1VE8M8Y13TTB5VWT-ABG5&rnd=387972.43607

   Do not use the WebEx conference call in line. Use the conference line provided with the RFP.

II. Questions:

1. Q) May companies from outside of the USA apply for this work (ie, India or Canada)?

   A) Yes.

2. Q) Do vendors need to come to Austin, Texas for meetings?

   A) Yes. We will require interaction face to face during initial "development/configuration" discussions and for training and hardware installation. We would also expect on site assistance during data migration and system implementation. Other meetings can be done remotely with the expectation they occur during normal business hours, Monday-Friday, US Central Standard time.

3. Q) Can the vendor perform the tasks (related to the RFP) outside of the USA (ie, from India or Canada)?

   A) As stated above.

4. Q) Can the vendor submit proposals by email?

   A) No the City does not accept proposals by email.

4. Q) Do you have a deadline date for questions set yet? If so, what is that date?

A) The deadline for all clarification questions is no later than 5:00 PM CST on February 2, 2017.

III. **ALL OTHER TERMS AND CONDITIONS REMAIN THE SAME.**

APPROVED BY: _____ 1/20/17

James T. Howard, Corporate Purchasing Manager Date
Purchasing Office, 512-974-2031

ACKNOWLEDGED BY:

ERIC J. NELSON Eric J Nelson 2/16/17

Name Authorized Signature Date

RETURN ONE COPY OF THIS ADDENDUM TO THE PURCHASING OFFICE, CITY OF AUSTIN, WITH YOUR RESPONSE OR PRIOR TO THE SOLICIATION CLOSING DATE. FAILURE TO DO SO MAY CONSTITUTE GROUNDS FOR REJECTION.

ADDENDUM
CITY OF AUSTIN, TEXAS

Solicitation: RFPJTH0309 Addendum No: 2 Date of Addendum: 2/3/2017

This addendum is to incorporate the following changes to the above referenced solicitation:

I. Clarifications:

1. **Proposal Due Date has been extended to 2/16/2017 at 2:00 P.M.**

2. **Attached is a SMBR Prebid Meeting Handout. Please review.**

II. Questions:

5. Q) What is considered the start of the warranty? When shipped? When installed in the field? Need clarification as those are two different conditions.

   A) Warranty must exist 24 months from the date of "shipment."

III. **ALL OTHER TERMS AND CONDITIONS REMAIN THE SAME.**

APPROVED BY: _____ 2/3/2017
James T. Howard, Corporate Purchasing Manager Date
Purchasing Office, 512-974-2031

ACKNOWLEDGED BY:

ERIC J. NELSON Eric J Nelson 2/16/17
Name Authorized Signature Date

RETURN ONE COPY OF THIS ADDENDUM TO THE PURCHASING OFFICE, CITY OF AUSTIN, WITH YOUR RESPONSE OR PRIOR TO THE SOLICIATION CLOSING DATE. FAILURE TO DO SO MAY CONSTITUTE GROUNDS FOR REJECTION.

Section 0605: Local Business Presence Identification

A firm (Offeror or Subcontractor) is considered to have a Local Business Presence if the firm is headquartered in the Austin Corporate City Limits, or has a branch office located in the Austin Corporate City Limits in operation for the last five (5) years, currently employs residents of the City of Austin, Texas, and will use employees that reside in the City of Austin, Texas, to support this Contract. The City defines headquarters as the administrative center where most of the important functions and full responsibility for managing and coordinating the business activities of the firm are located. The City defines branch office as a smaller, remotely located office that is separate from a firm's headquarters that offers the services requested and required under this solicitation.

OFFEROR MUST SUBMIT THE FOLLOWING INFORMATION FOR EACH LOCAL BUSINESS (INCLUDING THE OFFEROR, IF APPLICABLE) TO BE CONSIDERED FOR LOCAL PRESENCE.

NOTE: ALL FIRMS MUST BE IDENTIFIED ON THE MBE/WBE COMPLIANCE PLAN OR NO GOALS UTILIZATION PLAN (REFERENCE SECTION 0900).

USE ADDITIONAL PAGES AS NECESSARY

OFFEROR:

Name of Local Firm	Advanced Traffic Solutions, LLC	
Physical Address	3505 Sage Road, Suite 2309, Houston, Texas, 77056-7182	
Is your headquarters located in the Corporate City Limits? (circle one)	Yes	No
or		
Has your branch office been located in the Corporate City Limits for the last 5 years?	Yes	No
Will your business be providing additional economic development opportunities created by the contract award? (e.g., hiring, or employing residents of the City of Austin or increasing tax revenue?)	Yes	No

SUBCONTRACTOR(S):

Name of Local Firm	N/A	
Physical Address		
Is your headquarters located in the Corporate City Limits? (circle one)	Yes	No
or		
Has your branch office been located in the Corporate City Limits for the last 5 years	Yes	No

Will your business be providing additional economic development opportunities created by the contract award? (e.g., hiring, or employing residents of the City of Austin or increasing tax revenue?)	Yes	No

SUBCONTRACTOR(S):

Name of Local Firm	N/A	
Physical Address		
Is your headquarters located in the Corporate City Limits? (circle one)	Yes	No
or		
Has your branch office been located in the Corporate City Limits for the last 5 years	Yes	No
Will your business be providing additional economic development opportunities created by the contract award? (e.g., hiring, or employing residents of the City of Austin or increasing tax revenue?)	Yes	No

Section 0700: Reference Sheet

Responding Company Name Advanced Traffic Solutions, LLC

The City at its discretion may check references in order to determine the Offeror's experience and ability to provide the products and/or services described in this Solicitation. The Offeror shall furnish at least 3 complete and verifiable references. References shall consist of customers to whom the offeror has provided the same or similar services within the last 5 years. References shall indicate a record of positive past performance.

1. Company's Name: Montgomery County, TX (The Woodlands)
   Name and Title of Contact: Charles Cobb, Traffic Operations Manager
   Project Name: Traffic Signal Optimization and D4 Support
   Present Address: 1130 Pruitt Rd
   City, State, Zip Code: Spring, TX 77380-3025
   Telephone Number: (281) 705-2465 Fax Number (281) 298-7321
   Email Address: Charles.Cobb@mctx.org

2. Company's Name: City of Chandler, AZ
   Name and Title of Contact: Ben McCawley, Traffic Operations Manager
   Project Name: Citywide Deployment of D4 Controllers (210 intersections)
   Present Address: 215 E Buffalo St
   City, State, Zip Code: Chandler, AZ 85225-5909
   Telephone Number: (480) 782-3471 Fax Number (480) 782-3415
   Email Address: ben.mccawley@chandleraz.gov

3. Company's Name: City of San Francisco, CA
   Name and Title of Contact: Lauren Green
   Project Name: D4 Software Support (1,000+ Intersections)
   Present Address: 2650 Bayshore Blvd
   City, State, Zip Code: Daly City, CA 94014-1631
   Telephone Number: (415) 550-2769 Fax Number (515) 334-1017
   Email Address: Lauren.Green@SFMTA.com

City of Austin, Texas
NON-DISCRIMINATION AND NON-RETALIATION CERTIFICATION
SECTION 0800

City of Austin, Texas

Equal Employment/Fair Housing Office

To: City of Austin, Texas,

I hereby certify that our firm complies with the Code of the City of Austin, Section 5-4-2 as reiterated below, and agrees:

(1) Not to engage in any discriminatory employment practice defined in this chapter.

(2) To take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without discrimination being practiced against them as defined in this chapter, including affirmative action relative to employment, promotion, demotion or transfer, recruitment or recruitment advertising, layoff or termination, rate of pay or other forms of compensation, and selection for training or any other terms, conditions or privileges of employment.

(3) To post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Equal Employment/Fair Housing Office setting forth the provisions of this chapter.

(4) To state in all solicitations or advertisements for employees placed by or on behalf of the Contractor, that all qualified applicants will receive consideration for employment without regard to race, creed, color, religion, national origin, sexual orientation, gender identity, disability, sex or age.

(5) To obtain a written statement from any labor union or labor organization furnishing labor or service to Contractors in which said union or organization has agreed not to engage in any discriminatory employment practices as defined in this chapter and to take affirmative action to implement policies and provisions of this chapter.

(6) To cooperate fully with City and the Equal Employment/Fair Housing Office in connection with any investigation or conciliation effort of the Equal Employment/Fair Housing Office to ensure that the purpose of the provisions against discriminatory employment practices are being carried out.

(7) To require of all subcontractors having 15 or more employees who hold any subcontract providing for the expenditure of $2,000 or more in connection with any contract with the City subject to the terms of this chapter that they do not engage in any discriminatory employment practice as defined in this chapter

For the purposes of this Offer and any resulting Contract, Contractor adopts the provisions of the City's Minimum Standard Non-Discrimination and Non-Retaliation Policy set forth below.

City of Austin
Minimum Standard Non-Discrimination and Non-Retaliation in Employment Policy

As an Equal Employment Opportunity (EEO) employer, the Contractor will conduct its personnel activities in accordance with established federal, state and local EEO laws and regulations.

The Contractor will not discriminate against any applicant or employee based on race, creed, color, national origin, sex, age, religion, veteran status, gender identity, disability, or sexual orientation. This policy covers all aspects of employment, including hiring, placement, upgrading, transfer, demotion, recruitment, recruitment advertising, selection for training and apprenticeship, rates of pay or other forms of compensation, and layoff or termination.

The Contractor agrees to prohibit retaliation, discharge or otherwise discrimination against any employee or applicant for employment who has inquired about, discussed or disclosed their compensation.

Further, employees who experience discrimination, sexual harassment, or another form of harassment should immediately report it to their supervisor. If this is not a suitable avenue for addressing their compliant, employees are advised to contact another member of management or their human resources representative. No employee shall be discriminated against, harassed, intimidated, nor suffer any reprisal as a result of reporting a violation of this policy. Furthermore, any employee, supervisor, or manager who becomes aware of any such discrimination or harassment should immediately report it to executive management or the human resources office to ensure that such conduct does not continue.

Contractor agrees that to the extent of any inconsistency, omission, or conflict with its current non-discrimination and non-retaliation employment policy, the Contractor has expressly adopted the provisions of the City's Minimum Non-Discrimination Policy contained in Section 5-4-2 of the City Code and set forth above, as the Contractor's Non-Discrimination Policy or as an amendment to such Policy and such provisions are intended to not only supplement the Contractor's policy, but will also supersede the Contractor's policy to the extent of any conflict.

UPON CONTRACT AWARD, THE CONTRACTOR SHALL PROVIDE THE CITY A COPY OF THE CONTRACTOR'S NON-DISCRIMINATION AND NON-RETALIATION POLICIES ON COMPANY LETTERHEAD, WHICH CONFORMS IN FORM, SCOPE, AND CONTENT TO THE CITY'S MINIMUM NON-DISCRIMINATION AND NON-RETALIATION POLICIES, AS SET FORTH HEREIN, **OR** THIS NON-DISCRIMINATION AND NON-RETALIATION POLICY, WHICH HAS BEEN ADOPTED BY THE CONTRACTOR FOR ALL PURPOSES WILL BE CONSIDERED THE CONTRACTOR'S NON-DISCRIMINATION AND NON-RETALIATION POLICY WITHOUT THE REQUIREMENT OF A SEPARATE SUBMITTAL.

Sanctions:

Our firm understands that non-compliance with Chapter 5-4 and the City's Non-Retaliation Policy may result in sanctions, including termination of the contract and suspension or debarment from participation in future City contracts until deemed compliant with the requirements of Chapter 5-4 and the Non-Retaliation Policy.

Term:

The Contractor agrees that this Section 0800 Non-Discrimination and Non-Retaliation Certificate of the Contractor's separate conforming policy, which the Contractor has executed and filed with the City, will remain in force and effect for one year from the date of filling. The Contractor further agrees that, in consideration of the receipt of continued Contract payment, the Contractor's Non-Discrimination and Non-Retaliation Policy will automatically renew from year-to-year for the term of the underlying Contract.

Dated this 16th day of February, 2017

CONTRACTOR Advanced Traffic Solutions, LLC

Authorized Signature Eric J Nelson

Title President

Section 0815: Living Wages Contractor Certification

Company Name Advanced Traffic Solutions, LLC

Pursuant to the Living Wages provision (reference Section 0400, Supplemental Purchase Provisions) the Contractor is required to pay to all employees directly assigned to this City contract a minimum Living Wage equal to or greater than $13.50 per hour.

The below listed employees of the Contractor who are directly assigned to this contract are compensated at wage rates equal to or greater than $13.50 per hour.

Employee Name	Employee Job Title
Eric Nelson	President
Avery Rhodes	Senior Project Engineer
Brad Freudenberg	Senior Solutions Architect
Tim Gunnells	Senior Solutions Architect
Subbu Srinvasan	Software Developer
Sivani Salapaka	Software Developer

USE ADDITIONAL PAGES AS NECESSARY

(1) All future employees assigned to this Contract will be paid a minimum Living Wage equal to or greater than $13.50 per hour.

(2) Our firm will not retaliate against any employee claiming non-compliance with the Living Wage provision.

A Contractor who violates this Living Wage provision shall pay each affected employee the amount of the deficiency for each day the violation continues. Willful or repeated violations of the provision or fraudulent statements made on this certification may result in termination of this Contract for Cause and subject the firm to possible suspension or debarment, or result in legal action.

Section 0835: Non-Resident Bidder Provisions

Company Name Advanced Traffic Solutions, LLC

A. Bidder must answer the following questions in accordance with Vernon's Texas Statues and Codes Annotated Government Code 2252.002, as amended:

Is the Bidder that is making and submitting this Bid a "Resident Bidder" or a "non-resident Bidder"?

Answer: Resident Bidder

(1) Texas Resident Bidder- A Bidder whose principle place of business is in Texas and includes a Contractor whose ultimate parent company or majority owner has its principal place of business in Texas.
(2) Nonresident Bidder- A Bidder who is not a Texas Resident Bidder.

B. If the Bidder id a "Nonresident Bidder" does the state, in which the Nonresident Bidder's principal place of business is located, have a law requiring a Nonresident Bidder of that state to bid a certain amount or percentage under the Bid of a Resident Bidder of that state in order for the nonresident Bidder of that state to be awarded a Contract on such bid in said state?

Answer: _____ Which State: _____

C. If the answer to Question B is "yes", then what amount or percentage must a Texas Resident Bidder bid under the bid price of a Resident Bidder of that state in order to be awarded a Contract on such bid in said state?

Answer: _____

Section 0900: Minority- and Women-Owned Business Enterprise (MBE/WBE) Procurement Program No Goals Form

SOLICITATION NUMBER: RFP JTH0309

PROJECT NAME: Traffic Software

The City of Austin has determined that no goals are appropriate for this project. Even though goals were not assigned for this solicitation, the Bidder/Proposer is required to comply with the City's MBE/WBE Procurement Program, if areas of subcontracting are identified.

If any service is needed to perform the Contract and the Bidder/Proposer does not perform the service with its own workforce or if supplies or materials are required and the Bidder/Proposer does not have the supplies or materials in its inventory, the Bidder/Proposer shall contact the Small and Minority Business Resources Department (SMBR) at (512) 974-7600 to obtain a list of MBE and WBE firms available to perform the service or provide the supplies or materials. The Bidder/Proposer must also make a Good Faith Effort to use available MBE and WBE firms. Good Faith Efforts include but are not limited to contacting the listed MBE and WBE firms to solicit their interest in performing on the Contract, using MBE and WBE firms that have shown an interest, meet qualifications, and are competitive in the market; and documenting the results of the contacts.

Will subcontractors or sub-consultants or suppliers be used to perform portions of this Contract?

No X **If no, please sign the No Goals Form and submit it with your Bid/Proposal in a sealed envelope**

Yes _____ **If yes, please contact SMBR to obtain further instructions and an availability list and perform Good Faith Efforts. Complete and submit the No Goals Form and the No Goals Utilization Plan with your Bid/Proposal in a sealed envelope.**

After Contract award, if your firm subcontracts any portion of the Contract, it is a requirement to complete Good Faith Efforts and the No Goals Utilization Plan, listing any subcontractor, sub-consultant, or supplier. Return the completed Plan to the Project Manager or the Contract Manager.

I understand that even though goals were not assigned, I must comply with the City's MBE/WBE Procurement Program if subcontracting areas are identified. I agree that this No Goals Form and No Goals Utilization Plan shall become a part of my Contract with the City of Austin.

Advanced Traffic Solutions, LLC

Company Name

Eric J. Nelson, President

Name and Title of Authorized Representative (Print or Type)

Eric J Nelson

Signature

02/16/2017

Date

Minority- and Women-Owned Business Enterprise (MBE/WBE) Procurement Program No Goals Utilization Plan
(Please duplicate as needed)

SOLICITATION NUMBER:	RFP JTH0309
PROJECT NAME: TRAFFIC FIRMWARE	

PRIME CONTRACTOR / CONSULTANT COMPANY INFORMATION

Name of Contractor/Consultant	Advanced Traffic Solutions, LLC		
Address	3505 Sage Road, Suite 2309		
City, State Zip	Houston, TX 77056-7182		
Phone Number	(832) 405-8577	Fax Number	(713) 871-9639
Name of Contact Person	Eric J. Nelson		
Is Company City certified?	Yes ☐ No ☒ MBE ☐ WBE ☐ MBE/WBE Joint Venture ☐		

I certify that the information included in this No Goals Utilization Plan is true and complete to the best of my knowledge and belief. I further understand and agree that the information in this document shall become part of my Contract with the City of Austin.

Eric J. Nelson, President
Name and Title of Authorized Representative (Print or Type)

Eric J Nelson
Signature

02/16/2017
Date

Provide a list of all proposed subcontractors / sub-consultants / suppliers that will be used in the performance of this Contract. **Attach Good Faith Effort documentation if non MBE/WBE firms will be used.**

Sub-Contractor / Sub-Consultant	N/A		
City of Austin Certified	MBE ☐ WBE ☐ Ethics / Gender Code: ☐ Non-Certified		
Vendor ID Code			
Contact Person		Phone Number	
Amount of Subcontract	$		
List commodity codes & description of services			

Sub-Contractor / Sub-Consultant	N/A		
City of Austin Certified	MBE ☐ WBE ☐ Ethics / Gender Code: ☐ Non-Certified		
Vendor ID Code			
Contact Person		Phone Number	
Amount of Subcontract	$		
List commodity codes & description of services			

FOR SMALL AND MINORITY BUSINESS RESOURCES DEPARTMENT USE ONLY:

Having reviewed this plan, I acknowledge that the proposer (HAS) or (HAS NOT) complied with City Code Chapter 2-9A/B/C/D, as amended.

Reviewing Counselor _____ **Date** _____ **Director/Deputy Director** _____ **Date** _____

CITY OF AUSTIN
PURCHASING OFFICE
PURCHASING EXCEPTIONS
SECTION 301

Solicitation Number: RFP JTH0309

The offeror shall clearly indicate each exception taken, provide alternative language, and justify the alternative language. The offeror that is awarded the contract will be required to sign the contract with the provisions accepted; any exceptions may be negotiated or may result in the City deeming the offer non-responsive. Failure to accept or provide the exception information below may result in the City deeming the offer non-responsive.

1. **0300 STANDARD PURCHASE TERMS & CONDITIONS**

☒ Accepted as written. ☐ Not accepted as written. See below:

Indicate:
Page Number **Section Number** **Section Description**

Alternate Language:

Justification:

NOTE: Copies of this form may be utilized if additional pages are needed.

CITY OF AUSTIN
PURCHASING OFFICE
PURCHASING EXCEPTIONS
SECTION 301

Solicitation Number: RFP JTH0309

The offeror shall clearly indicate each exception taken, provide alternative language, and justify the alternative language. The offeror that is awarded the contract will be required to sign the contract with the terms and conditions accepted; any exceptions may be negotiated or may result in the City deeming the offer non-responsive. Failure to accept or provide the exception information below may result in the City deeming the offer non-responsive.

2. **0400 SUPPLEMENTAL PURHCASE PROVISIONS**

☒ Accepted as written. ☐ Not accepted as written. See below:

Indicate:
Page Number **Section Number** **Section Description**

Alternate Language:

Justification:

NOTE: Copies of this form may be utilized if additional pages are needed.

CITY OF AUSTIN
PURCHASING OFFICE
PURCHASING EXCEPTIONS
SECTION 301

Solicitation Number: RFP JTH0309

The offeror shall clearly indicate each exception taken, provide alternative language, and justify the alternative language. The offeror that is awarded the contract will be required to sign the contract with the terms and conditions accepted; any exceptions may be negotiated or may result in the City deeming the offer non-responsive. Failure to accept or provide the exception information below may result in the City deeming the offer non-responsive.

Place t

3. **0500 SCOPE OF WORK**

☒ Accepted as written. ☐ Not accepted as written. See below:

Indicate: **Page Number**	**Section Number**	**Section Description**
Alternate Language:		
Justification:		

NOTE: Copies of this form may be utilized if additional pages are needed.

Tab D. Background and Experience

History

The D4 software was first deployed by Fourth Dimension Traffic in 2003. Mr. Eric Nelson was an employee of Fourth Dimension Traffic but started his own company Advanced Traffic Solutions, LLC in 2008 as a strategic partner to Fourth Dimension Traffic. Advanced Traffic Solutions has been involved with the design and testing of the D4 since that time participating in the software development, software testing, customer support and distribution of the product. In 2014, Advanced Traffic Solutions acquired Fourth Dimension Traffic and now oversees the development and support of the D4 software as the parent company.

The first deployment of the D4 software was in the City of San Francisco. Being a very transit oriented community, the D4 developers were challenged to come up with advanced transit and priority features which is one of the reasons D4 has the most advanced transit and priority support of any local controller software presently on the market. We have continued to expand upon these ideas which was to produce the most powerful controller available that was still easy for technicians and engineers to use.

Over the years the D4 has expanded to over 5,000 deployments across the United States and Canada in a variety of different sized jurisdictions. Several of our deployments are similar in scope and nature to the proposed deployments in the City of Austin and the City of San Antonio. We are experienced in providing customer support and developing new features for new and existing customers.

Many of the operational controller requirements we are seeing in this RFP were pioneered by the D4 software. These features have been running in the field for years and are not simply being thrown into the software to satisfy an RFP. Some of these features are summarized:

- Transit Phases
- Adaptive Priority
- Emergency Vehicle Priority
- Different detection modes for Flashing Yellow Arrow
- Built-in support for the Pedestrian Hybrid Beacon (using multiple modes)
- Ability to change phase next decision during clearance intervals

Our vision is to continue to innovate features that make it easier for traffic engineers to accomplish their goals. Many of the features we develop become standard thereby challenging us to continue innovating ways of improving the transportation system from the local intersection level up. Our company has brought together skilled and passionate traffic engineers who have the creativity to develop new functionality along with experienced developers that can effectively implement these ideas into software.

Products and Services

Advanced Traffic Solutions, LLC is a Texas owned and operated firm that specializes in software development, traffic engineering and Intelligent Transportation Systems (ITS). We have worked at all levels of 2070 ATC controller deployment including supplying support services for the D4 firmware. This includes:

- Hardware specifications (2070 ATC, I/O, detectors, and communications equipment)
- Firmware installation
- Controller configuration (communications parameters, database upload/download)

- Integration with existing equipment and communication networks
- Controller timing and timing plan specification
- Controller testing and test planning
- Training

As our company is primarily a traffic signal controller software developer and traffic engineering firm we are deeply committed to working with as many different ATMS systems and local control hardware suppliers as possible. We currently have deployments with four of the major ATMS systems including KITS, Centracs, MIST and TransSuite. We also work with a variety of hardware platforms including: Econolite 1C, Intelight 1C, McCain 1C, McCain ATCeX, Peek 1C and Siemens 1C. Any software development to meet the requirements of this RFP will be completed early in the process so that appropriate testing can be completed prior to field deployment.

Our firm has an extensive traffic engineering background so our capabilities extend to traffic signal timing development, evaluation, deployment, fine tuning, database conversions etc. The company consists of the owner, Mr. Eric J. Nelson, P.E.; a senior project engineer, Mr. Avery Rhodes, P.E.; and a software development team led by Brad Freudenberg. Although we are a small firm, we see this as an advantage as we can quickly and directly respond to customer needs and implement them in software quickly. Mr. Nelson and Mr. Rhodes have both worked on the agency side and understand the needs from the public agency perspective.

As both a traffic engineering and software development company we are uniquely qualified to provide advanced local control software that meets a variety of needs in an increasingly complex transportation system. Advanced Traffic Solutions provides traffic engineering services that focus primarily on traffic signal timing, controller deployment, and fine tuning across all controller software and hardware platforms. In addition, the company also provides D4 support and training for agencies. Samples of various relevant activities are listed below:

- Hewlett Packard (HP) Traffic Signal Upgrades (with D4)
- Harris County Emergency Vehicle Priority System Integration with E-Views
- Harris County Changeable Lane Assignment (CLAS) Project (with D4)
- Houston Metro LRT Downtown Queue Jump / Transit Priority Implementation
- Montgomery County, Texas Signal Timing Services and Conversion of Existing Databases to D4
- City of Arcadia (CA) signal re-timing and conversion to D4
- Traffic signal software development
- Signal timing plan development (arterial coordination and TSP)
- Traffic management system integration
- ITS/NTCIP device software development and standards
- Third party adaptive system support

Advanced Traffic Solutions supports D4 agencies providing training and related traffic engineering services. Current agencies that we support with D4 deployment, D4 training and/or maintenance contracts are listed in the table on the next page.

Advanced Traffic Solutions also works closely with agencies to gain a thorough understanding of the operational objectives they would like to achieve and will then work side by side with our developers to aid in the design and testing of new functionality. In addition, Advanced Traffic Solutions supports the Virtual D4 for VISSIM and other Fourth Dimension Traffic products including the virtual TS-2 / ITS tester.

Agency	Initial Deployment	Central System
City of San Francisco, CA	2003	MIST
City of San Jose, CA	2007	TransSuite
City of Stockton, CA	2008	TransSuite
City of Sacramento, CA	2008	TransSuite
City of Windsor, ON	2009	KITS
Macomb County, MI	2010	Centracs
Virginia Department of Transportation	2011	MIST
City of San Mateo, CA	2012	KITS
Harris County, TX	2012	i2TMS
City of Chandler, AZ	2013	TransSuite
Montgomery County, TX	2014	Centracs
City of Arcadia, CA	2014	TransSuite
City of Long Beach, CA	2015	N/A
City of Mesa, AZ	2016	Centracs
City of Diamond Bar, CA	2016	TransSuite

Software Development

The Advanced Traffic Solutions team has extensive experience in the development, integration and support of local control software. We have four full time developers working in our Houston office. Our software development team has decades of experience in a variety of fields including the traffic industry. We are continually adding new features and adapting the software to meet the needs of challenging new projects. Additionally, we are continually expanding the number of hardware platforms that the D4 supports.

Our experience includes multiple projects in the development of 2070 ATC firmware for intersections. This experience includes:

- Application development for the 2070 ATC using the OS-9 and Linux operating systems
- Communications programming including serial and network interfaces
- Custom traffic signal control algorithm development and implementation
- Support for the new ATC cabinet standards

Eric J. Nelson, P.E. and Avery Rhodes, P.E. of Advanced Traffic Solutions are an extension of the software development team bringing real world experience and a traffic engineering perspective to the development and testing phases. We have a thorough understanding of how to use the logic functions of modern control equipment to tailor the operations to the specific needs of the agency. For years, we have worked to minimize the need for controller logic functions for advanced uses such as transit priority, flashing yellow arrow, and diamond interchange operation with the goal of making advanced and efficient operations easier to obtain for all users.

Industry Standards

We have been involved in ITS/NTCIP device software development and standards. We have also been involved in the development the Signal Timing Manual and NCHRP Report 812 (Signal Timing Manual, Second Edition). We are currently working on projects in Michigan and Viriginia to communicate Signal Phase and Timing (SPaT) data to Road Side Equipment (RSE). We have also been working closely with other industry partners as the ATC cabinet

standards have emerged. We have attended workshops on the Advanced Transportation Controller (ATC) Application Programming Interface Verification Suite (APIVS). We have also worked with the Utah Department of Transportation (UDOT) to become an integrator of their Advanced Traffic Signal Performance Measures (ATSPM) software. Mr. Nelson is a former member of the TRB Traffic Signal Systems committee.

The D4 software is unique in that it is completely open architecture and supports all 1B/1E (OS-9) modules and most Linux modules. The 1B/1E (OS-9) modules were standard which means if it worked on one module it should work on all modules. Most software vendors tend to develop software that is only 100% functional on their own ATC controller hardware. Given that we are a software only provider we have bridged this gap by providing the user software that operates across many ATC platforms thereby giving agencies openness and flexibility to mix and match when selecting controller hardware. The following is an alphabetical listing of ATC hardware presently supported:

- Econolite 1C
- Intelight 1C
- McCain 1C
- McCain ATCeX (option for NEMA TS-1 / TS-2 users)
- Quixote / Peek 1C
- Siemens 1C

The D4 software works across multiple hardware and central system platforms thereby providing the "best value" with the range of 3rd party vendors and central systems providers that the software supports. D4 supports both the AB3418 and NTCIP protocols. The following is an alphabetical listing of other central systems that the D4 firmware is integrated with:

- Centracs
- KITS
- MIST
- TransSuite

Quality Assurance/Quality Control

Advanced Traffic Solutions was created with a vision of providing high quality, customer driven software and technical support services to the transportation industry. While Advanced Traffic Solutions is lean and efficient. Below are three areas that describe our commitment to quality management:

Culture - Emphasize knowledge and expertise, including a hands-on approach to solving technical issues. Employees are chosen for depth of technical experience and relevancy of technical skills. Constant communication is maintained using the latest technologies.

Attitude - Advanced Traffic Solutions creates quality in products and services through employee enthusiasm for the work. Employees are all specialists in their fields, and receive satisfaction from quality results in their area of expertise.

Organization - Advanced Traffic Solution's goal of efficiency is reflected in a flat organizational hierarchy, where all employees are empowered to take direct action to meet customer needs. Quality feedback is immediate and effective by keeping the team small and responsive.

Management Practices

Our team understands and endorses the following concepts for product and services realization:

- The formal capturing of desired functionality in requirements documents
- Traceability of requirements through design, implementation and testing
- Traceability of requirements in providing professional services
- Traceability of requirements in verification and validation testing

These concepts provide our team the best tools for minimizing scope creep, schedule delays (including delays due to excessive development time) and maximizing the satisfaction of project stakeholders. To ensure compliance, our team implements the following quality management procedures:

- Control of Documents – All documents produced by the team will be maintained by a document control and revision system. These documents will be placed under a formal change control process. Documents considered released will require a Document Change Order to modify.
- The Document Change Order will include the following at a minimum:
    - The party requesting change
    - A description of the change, including traceability to requirements
    - The party responsible for implementing the change
    - The action taken to change the document
    - Verification the document has been changed
- Software deliverables will be version controlled to provide unique identification of the product
- Control of Non-Conforming Products / Services – In the event of deficiencies in software or services, a deficiency tracking system will be utilized and such status will be included in the regular status reporting process. Deficiencies will be evaluated by the Project Stakeholders and the project team to determine when and how corrective action will be taken, consistent with the terms of the contract. However there is nothing to prevent the project team from going above and beyond to remedy the situation.
- Corrective Action – Should a deficiency require a corrective action, a formal Engineering Change Order will be issued. This Engineering Change Order will include the following, at a minimum:
- The party requesting the change
- A description of the deficiency, including traceability to requirements
- The party responsible for resolution of the deficiency
- The action taken to resolve the deficiency
- Verification that the deficiency has been resolved

Advanced Traffic Solutions anticipates that these quality management practices, implemented by a small responsive team, will lead to the successful completion of this project.

Training

We specialize in providing technical assistance and training to clients to help them get the most out of their traffic signal systems. Our staff has been providing training to a wide variety of clients for years. Each training program is especially tailored to the specific audience whether it be management and decisions makers, engineers and IT professional, or field and communications technicians.

Our training typically consists of using an actual controller in a test cabinet environment (we have a TS2 / ITS tester that can simulate a cabinet displaying cabinet inputs and outputs). This method also allows us to display the actual controller front panel so that attendees can

get familiar with the menu layouts and real-time status display screens. The screens shown in class are identical to the ones you would see standing in front of the controller in the field.

For more advanced training classes, we have used simulation models in order to demonstrate how D4 would handle transit priority and the more complex operations (as a system). The full version of D4 for VISSIM is used to model the latest features and pass the final settings along to the actual controller without the need to reenter the data. The same database editor that is used for the actual controller also passes the data to the virtual controller(s).

We have training manuals already developed that will be further personalized for the City of Austin and City of San Antonio to highlight the functionality that will most likely be of interest to each individual city. All training materials are designed to be retained by the agency as they will become a valuable reference material.

Issue Resolution

The goal of this team is to do our due diligence and identify issues before they become problems. This coincides with the extreme care that is taken in ensuring that customary items such as database compatibility and other common factors that allow things to get to this point are addressed. Our team is structured in such a way that remote support and bug validation via e-mailing the database .DAT file is simple and immediate. In the event that a major bug is verified, it is typically fixed that day and released to the affected agencies within a week after further testing.

Being a small company and working directly with the clients allows us to cut through the red tape and get things done. Any known bugs of the minor variety are also fixed in the subsequent release, as we do not continue to release versions with known issues or recreate bugs present from previous versions. Advanced Traffic Solutions has thorough knowledge of how traffic signals operate and catch most issues before being seen by the client. In the event an issue does arise we would do our best to make things right. The success of the project and client relationships is most important to this team. We are passionate about what we do and will go above and beyond to ensure that each project is successful.

Tab E. Staff

Eric J. Nelson, P.E. – President

The primary contact and project manager for this proposal will be Eric J. Nelson, P.E. who is the President of Advanced Traffic Solutions, LLC since forming the company in 2008. Mr. Nelson has performed a similar role for other customers including the City of Chandler, AZ (since 2010), Macomb County, MI (since 2010), Harris County, TX (since 2008), Montgomery County, TX (since 2014), and Arcadia, CA (since 2014).

Mr. Nelson is the former Vice President of Traffic Engineering with Fourth Dimension Traffic and was the primary technical support contact for the software during that time. After forming his own company he maintained a strategic partnership with Fourth Dimension serving as their sole distributor and technical support contact for the D4 software in the United States and Canada (excluding California, Oregon and Washington).

After maintaining this close alliance with Fourth Dimension Traffic for many years, Advanced Traffic Solutions, LLC purchased the company in 2014 and continues to develop and support the D4 Traffic Signal Software, which is quickly gaining traction throughout the United States and Canada. Over his career, Mr. Nelson has been involved in many advanced traffic engineering projects that have utilized the advanced controller features requested in this RFP to deploy advanced strategies such as emergency vehicle priority and Changeable Lane Assignment (CLAS) (Harris County, TX). Mr. Nelson has also been involved in transit priority projects for agencies in Salt Lake City, Phoenix, San Francisco, Houston and Long Beach.

Prior to Mr. Nelson's time at Advanced Traffic Solutions, LLC and Fourth Dimension Traffic he served as the Chief Traffic Operations Engineer at Harris County for more than five years and was responsible for the safe and efficient operation of over 750 traffic signals. Mr. Nelson personally worked on the development and deployment of 28 coordinated arterial streets consisting of approximately 420 traffic signals.

Mr. Nelson has nearly 20 years of experience working with various controller hardware and software platforms. His balanced public and private sector experience includes the Illinois Department of Transportation (IDOT), Purdue University, Siemens ITS, Harris County, TX, Fourth Dimension Traffic and Advanced Traffic Solutions. This combination of public and private experience allows Mr. Nelson to deliver this type of project successfully and understand the client's perspective.

From 2000 to 2003 Mr. Nelson worked for Siemens ITS and was the primary support person for the NextPhase intersection management software. Mr. Nelson is a registered professional engineer in Texas and a longstanding member of both ITE and ASCE. He also served as a member of the TRB Traffic Signal Systems Committee (since 2008). His balanced public and private sector experience and knowledge of the various hardware and software platforms help bring a level of expertise not common in the industry. Mr. Nelson has five years of public sector experience and over 8 years of experience supporting the D4 firmware proposed for this project.

Avery Rhodes, P.E. – Senior Project Engineer

Another point of support for this contract will be Avery Rhodes, P.E. who is a recent addition to Advanced Traffic Solutions. Mr. Rhodes has sixteen years of traffic engineering experience in both the public and private sectors. His personal interest and expertise is in traffic signal operations and transit signal priority. Mr. Rhodes has hands-on cabinet and controller experience particularly with projects that involve complex or unusual intersections or phasing.

Mr. Rhodes has 11 years of experience with a variety of traffic controllers including Econolite ASC/2, ASC/3 and Cobalt, Siemens SEPAC, Siemens NextPhase, and the D4. Mr. Rhodes has substantial experience with central traffic signal systems including Siemens i2TMS, Econolite Centracs and Kimley-Horn's KITS. He also is familiar with adaptive control having personally managed a SCATS and Kadence system.

Mr. Rhodes is experienced with controller deployment and database conversion. He recently completed a 25 controller deployment of D4 along an existing light rail line with transit priority in Mesa, Arizona. He is also familiar with light rail design projects having been closely involved with two recent projects (2014 through 2016) that included over 30 signalized intersections.

On the public side, Mr. Rhodes has experience managing design, construction and procurement projects and was personally responsible for a $4.5 million operating and $1.5 million CIP budget over the last 5 years with the City of Mesa. He was also responsible for managing a group responsible for the City's Traffic Management Center, the City's ITS communications system and the field staff responsible for maintenance and operations of the City's 456 traffic signals.

Prior to joining the City of Mesa, Mr. Rhodes was the ITS Manager at the City of Glendale where he was responsible for managing the City's signal timing efforts, ITS projects and special event traffic management at the Arizona Cardinals stadium and Arizona Coyotes arena. Mr. Rhodes has also worked on the private sector side primarily as a traffic signal designer and obtained a master's degree in civil engineering from Purdue University where his main research topic was developing a method to evaluate stop bar detection at signalized intersections.

Mr. Rhodes is a registered professional engineer in Arizona and a longstanding member of ITE and IMSA. Over the past year he has been a power user of the D4 software and hopes to utilize that knowledge to solve complex transportation problems across the country. Mr. Rhodes has 16 years of experience in the Traffic Engineering field including over eleven years of public sector experience.

Brad Freudenberg – Software Development Manager

Mr. Freudenberg has over twenty years of experience in software development and database management. He has been responsible for the design, development, and support for dozens of small and large-scale projects across a variety of industries including banking, energy trading, airlines, electrical power and transportation. He will be the lead interface with the software development team. His skills include team leadership, project management, solution design, software development, and customer support in large-scale real-time environments.

Mr. Freudenberg is a member of Rotary Club International and has degrees in Business Management and Business Analysis from Texas A&M University.

Tim Gunnells – Senior Solutions Architect

Mr. Gunnells has over twenty years of experience in software development and is the lead developer working on the D4 software and related products, including the Ring Based Controller (RBC) for VISSIM. His expertise includes implementing NTCIP protocols, Linux development, troubleshooting / addressing third party interfaces, and implementing new functionality for current projects such as development of the D4 Status Monitor. He also successfully migrated the D4 code to a single base that can provide builds for all supported hardware types. Mr. Gunnells has been instrumental in allowing Advanced Traffic Solutions to continue our long record of delivering quality software within budget and on time.

Mr. Gunnells and Mr. Freudenberg have been collaborating on software development projects since 1993, initially working together while students at Texas A&M.

Subbu Srinivasan – Software Developer

Mr. Srinivasan brings a unique mix of software expertise to the team. He has been instrumental in allowing Advanced Traffic Solutions to respond quickly to feature requests and bug fixes. Mr. Srinivasan was the key lead in developing the Indiana data logger for D4 and the subsequent integration into the UDOT ATSPM open software. Mr. Srinivisan also led the effort to implement Signal Phasing and Timing (SPaT) data for Connected Vehicles into the D4 controller, technology that is being used via D4 in Michigan and Virginia. Mr. Srinivasan is also very familiar with the NTCIP protocol and takes the lead on NTCIP updates and implementation.

Sivani Salapaka – Software Developer

Ms. Salapaka has a background in embedded development, and has been instrumental in expanding internal logging to the D4 in order to better assist the team in identifying and troubleshooting issues. This has drastically reduced problem resolution time and improved turnaround time on feature requests by rapidly identifying areas of the code that require attention. This program is the beginning of our automated testing utility that will help ensure our team continues to deliver quality software in a timely manner.

Recently she has been involved with the development of the D4 for the ATC cabinet environment as well as updating the D4 Installer to support new controller types. She is also responsible for designing and updating D4 menu and status display screens along with building and testing RBC modifications for VISSIM.

Resumes

The resumes for Mr. Nelson, Mr. Rhodes and Mr. Freudenberg (whom the City will interact with directly) are included in the following pages.

Resume for: **Eric J. Nelson, P.E.**

Title: President

Education: Master of Science, Civil Engineering, Purdue University, 2000
Bachelor of Science, Civil Engineering, Purdue University, 1998

Years of Experience: *Eighteen Years*

Previous Experience:

President
Advanced Traffic Solutions, LLC
Houston, Texas — Current ('09-'17)

Senior Traffic Engineer
Fourth Dimension Traffic
Houston, Texas — 1 Years ('08-'09)

Chief Traffic Operations Engineer
Harris County Public Infrastructure Department
Houston, Texas — 5 Years ('03-'08)

Transportation Systems Integrator
Siemens GTS
Tucson, Arizona — 3 Years ('00-'03)

Professional Affiliations: Institute of Transportation Engineers (ITE)
American Society of Civil Engineers (ASCE)

Summary: Mr. Nelson is the President of Advanced Traffic Solutions, a software and traffic engineering company specializing in the development of innovative approaches to complex traffic and transit issues. Mr. Nelson has been involved with numerous light-rail and transit priority projects in cities such as Houston, Long Beach, Phoenix, Salt Lake City, and San Francisco.

Projects:

Houston Regional Traffic Signal Operations (2012-Current)
Mr. Nelson has various on-call timing projects in the Houston region to assist with traffic operations. Projects include the signal optimizations for the majority of Missouri City and The Woodlands, US-90, Williams Trace, Sweetwater, University Blvd and SH-6 (AM / PM-Peak) in the City of Sugar Land, FM-518 and Magnolia in the City of Pearland, and various specialty projects for TXDOT such as the Harris County CLAS project.

Harris County Emergency Vehicle Priority Operations (2012-Current)
This project involved working with Harris County and ESD-11 to develop and implement a priority system that is aggressive enough to respond to

emergency vehicles while minimizing the disruption to traffic. It uses a GPS system to send travel time and route information directly to the controller which prepares for the vehicle arrival without skipping phases. This system is the first of its kind in the nation to bring in the associated left-turn when requested while maintaining normal coordinated operations and sequences before and after the arrival of the emergency vehicle.

City of San Antonio Traffic Signal Timing (2011)
This project involved reviewing signalized corridors that were recently timed but receiving various complaints by the public. In all there were 7 corridors that were reviewed and optimized with 4 timing plans. Areas of focus included downtown San Antonio (Commerce, Market / Dolorosa, Flores) and the San Antonio Medical Center (Wurzbach Pkwy) where improvements of up to 35% reduction in travel time were achieved over recent timings. Average for all corridors was ~20%.

City of Austin Downtown Traffic Signal Timing (2011)
This project involved reviewing the downtown traffic signal operations bounded by Mo-Pac, IH-35, MLK, and Riverside / Barton Springs. The focus was to review and adjust the existing peak period operations and come up with new timing plans for the off-peak periods, including shorter cycle lengths, slower speeds and optimized pedestrian timings. The team was also tasked with making capital improvement recommendations.

City of Sugar Land Timing Optimization for SH-6 (Fall 2009)
Mr. Nelson was responsible for the timing optimization for the planned opening of a triple left-turn from westbound US-59 to southbound SH-6. Realizing that the two intersections immediately south of US-59 were capacity constrained and needed sizeable operational improvements to prevent future backup to the interchange, he worked with project stakeholders to develop striping plans that would allow the team to un-split three critical intersections downstream of the triple left-turn. Such changes allowed the lane to be opened without issue which eventually led to additional work to retime the entire SH-6 corridor (13 intersections) for the peak periods. These additional efficiencies allowed the AM and PM-Peak cycle lengths to be reduced by 40 and 45 seconds respectively.

Houston Uptown Light-Rail Modeling (Summer - Fall 2009)
Mr. Nelson was responsible for working with the project team to develop a traffic simulation model that would illustrate how the traffic signals along Post Oak Blvd would operate if light-rail were to run along this corridor. It focused on modeling existing conditions and then comparing that to the proposed operations (with new signals, stations, etc). The analysis and simulations (using the proposed design) showed that the impact of rail along this corridor would be negligible with a priority type operation.

Houston Metro Light-Rail – Downtown Queue Jump (Spring 2009)
Mr. Nelson was responsible for implementing train queue jump logic at 22 downtown intersections to reduce light-rail collisions with vehicles making illegal left-turns. Prior to this effort the downtown light-rail would time

concurrently with the parallel vehicular movements and the train would preempt downstream signals to extend the green. This frequently resulted in considerable delay at downstream signals if the train were to dwell at stations longer than expected. Mr. Nelson converted the timing databases to a priority type scheme that would maintain cross street progression (with the downtown grid) and limit the amount of time that the train can extend the green to a constant 20 seconds (for worst case). This project proved more challenging than previous ones due to the tight intersection spacing and poor progression along the corridor, therefore Mr. Nelson implemented cascading calls that would initiate priority at the downstream intersection only if the logic determined that the train would make the upstream intersection.

Chief Traffic Operations Engineer – Harris County, TX (2003 to 2008)
Mr. Nelson's primary responsibility was managing the traffic operations program at the county and coordinating with partner agencies (TXDOT and City of Houston) in areas where the crossing arterials were managed by different agencies. He developed global schedules and cycle lengths that were harmonic to each other such that the coordination can be maintained on intersecting streets and easily expanded to other areas of the county. This procedure is mentioned in the Traffic Signal Timing Manual, and the scheme continues to be expanded upon to this day.

Interstate-10 & Beltway-8 Traffic Management (2007 to 2008)
Mr. Nelson's responsibilities involved staying on top of the detour patterns as the various direct connectors between the freeway systems were closed for reconstruction. Each closure would last months and resulted in thousands of additional vehicles using the frontage road system. Thus, the traffic signals along Beltway-8 (Memorial to Hammerly) and Interstate-10 (Wilcrest to Gessner) were equipped with detection and more advanced timing databases that would better respond to the changing traffic patterns. Mr. Nelson's responsibility was to ensure that traffic signals (7) along these routes were running the optimal coordinated plan and ready for the pending night-time and/or weekend closures.

Westpark Tollway Signal Operations (Various – 2005 to 2008)
Mr. Nelson's main responsibility was to improve the traffic operations along the Westpark Tollway. The most congested areas were at the termination points between S Rice Ave and IH-610 (on Westpark Dr) and at FM-1464 where the expressway ended for a period while the Fort Bend section was being constructed. As a result, Mr. Nelson came up with a new striping plan (between S Rice Ave and IH-610) and more innovative traffic control strategies at the termination points. Updated coordination plans were also installed along the parallel routes to help relieve congestion, mainly Westpark Dr and Harwin / Alief-Clodine Rd.

FM-1960 & Kuykendahl Reconstruction (Winter 2004)
This work involved doing a simulation analysis of the proposed grade separated interchange to illustrate that the millions of dollars proposed for this project would not improve the congestion at this location. The

fundamental misunderstanding was that the time gained by suppressing Kuykendahl under FM-1960 would be lost when FM-1960 could no longer run both thru movements simultaneously (due to the tight diamond design). After multiple meetings showing the quantitative comparisons of the various alternatives, the interchange was eventually redesigned to a single point such that the left-turns on FM-1960 and the ramps could run simultaneously. This interchange was recently completed in late 2009.

City of Phoenix Light Rail Project (Various – 2002 to 2003)
Mr. Nelson's main responsibilities involved working with the consultant team to review intersection design and aid with the VISSIM modeling using the Virtual NextPhase software. He also provided support and training to city staff and other stakeholders involved with the project.

City of Houston Light Rail Project (Various – 2001 to 2003)
Mr. Nelson attended meetings and provided guidance regarding signal design, detector locations, and the proposed traffic operations along the rail corridor. He also wrote an extensive concept of operations document near the beginning of the project that was helpful in bringing stakeholders on board with the operational issues related to light-rail. He prepared phasing and ring configuration diagrams (with priority) along with input / output mapping for each of the 65 intersections. His duties also included reviewing the VISSIM model to ensure that Virtual NextPhase was properly modeling the priority scheme proposed for implementation.

UTA Light Rail University Line; Salt Lake City, UT (Fall 2001)
Mr. Nelson designed and deployed the signal operations and dynamic timing plans along the University Line. He also specified the cabinet wiring that was to be used throughout the system, and developed the controller databases that would run each of the intersections. The priority scheme was much like the N/S line, but because of the additional phases (no longer 2-Phase) and higher traffic volumes, more creative methods were developed to accommodate the train, such as swapping the phase sequence and inserting additional LRV service opportunities. Mr. Nelson also converted the Olympic Timing plans provided by the city into dynamic plans that were compatible with the LRV algorithm, as well as update the priority service at central, which cascades transit detector calls in order to prepare downstream intersections for the approaching LRV.

3RD Street Light Rail; San Francisco, CA (Summer 2001)
Mr. Nelson configured seven intersections of an existing VISSIM Model for the 3rd Street LRT corridor using Virtual NextPhase to illustrate how the software would accommodate the LRV while maintaining vehicular progression along the corridor. The model used priority schemes like those in Salt Lake City. It was then compared against other controller packages and was found to provide similar LRV service, but much better service for vehicular traffic, indicating that the program was doing a better job of maintaining coordination. The line began revenue service in 2007.

UDOT Ramp Metering System; Salt Lake City, UT (Summer 2001)
Mr. Nelson converted the NextPhase software into a ramp-metering program that would run the ramp meters along the freeway system. Tasks included defining various metering rates and providing queue detection on the ramp that would dynamically change the rates when congestion was detected. This program also controlled the advance warning signs and contained special startup and shutdown logic to better prepare motorists for activation and de-activation of the ramp meter.

UTA Light Rail System – N/S Line; Salt Lake City, UT (Winter 2001)
Mr. Nelson upgraded the existing operations along the N/S line with a priority scheme that more aggressively accommodated light-rail vehicles. This scheme focused on improving vehicular progression, while providing a high level of service for the transit vehicle. As part of the upgrade, he developed dynamic timing plans for each of the 22 locations; these plans, combined with a central service designed by Mr. Nelson (cascades detector calls), helped better prepare downstream intersections for approaching light-rail vehicles. This service later became the peer to peer logic in the NextPhase software.

Diamond Interchange Research (Various - 2001 to Current)
Mr. Nelson continues to expand his research on diamond interchange operation and has introduced additional solutions that use the flexibility of the NextPhase software to better control the interchange under actuated conditions. The scheme runs most diamond sequences and guarantees appropriate travel time clearances under the various actuated scenarios. Mr. Nelson has included some of his own sequences and structured the database such that it transitions smoothly between the various modes of operation. There are currently interchanges running this scheme in Houston and Irving, TX, not to mention more recent versions of the database (7) that were deployed during the Interstate-10 & Beltway-8 re-construction in 2007-2008. Ten more were recently installed along Beltway-8 from Mesa to US-90 which is presently under construction.

Bellaire Blvd Transit Priority; Houston, TX (November 2000)
Mr. Nelson designed and configured the transit priority databases for 15 locations along Bellaire Blvd, from Chimney Rock to Corporate. It was an actual field demonstration that used a low-priority optical input to trigger the priority algorithm. The system focused on maintaining the best coordination for vehicular traffic as possible, while having the ability to instantly extend or shorten movements to best accommodate the transit vehicle(s), within the coordinated cycle.

Publications and *Presentations:*

Nelson, E., "Strategies for Accommodating Pedestrians at Signalized Intersections: Harris County's Experience", TRB 88th Annual Meeting in Washington, D.C., January 11th 2009.

Nelson, E., "Timing Strategies for Managing Oversaturation in Harris County", TRB 86th Annual Meeting in Washington, D.C., January 21st 2007.

Nelson, E., "Arterial Traffic Management Techniques in Harris County", TexITE Meeting (HESS Club) in Houston, TX, November 8th 2006.

Nelson, E., "Timing Strategies for Managing Oversaturation in Harris County", TRB Signal Systems meeting in Woods Hole, MA, July 11th 2006.

Nelson, E., "Arterial Traffic Management Techniques in Harris County," ITE summer meeting in College Station, TX, June 24th 2006.

Nelson, E., "Advanced Capabilities of the 2070 ATC", IMSA summer meeting in Clear Lake, TX, June 20th 2006.

Nelson, E., D. Bullock, and T. Urbanik, "Actuated Control of Diamond Interchanges," Journal of Transportation Engineering, ASCE, Vol. 126. No. 5, pp. 390-395, September / October 2000.

Nelson, E. and D. Bullock, "Impact Evaluation of Emergency Vehicle Preemption on Signalized Corridor Operation," Transportation Research Record, #1727, National Research Council, Washington, DC, pp. 1-11, 2000.

Nelson, E., "Quantitative Evaluation of Closed Loop Signal Systems," Unpublished Thesis, Purdue University, 2000.

Resume for: **Avery Rhodes, P.E.**

Title: Senior Project Engineer

Education: Master of Science, Civil Engineering, Purdue University, 2005
Bachelor of Science, Civil Engineering, New Mexico State, 2000

Years of *Experience:* Sixteen Years

Previous Experience:

Senior Traffic Engineer Advanced Traffic Solutions, LLC Houston, Texas	Current
Intelligent Transportation Systems Engineer City of Mesa Transportation Department Mesa, Arizona	5 Years (’11-’16)
Intelligent Transportation Systems Manager City of Glendale Transportation Department Glendale, Arizona	5 Years (’06-’11)
Intelligent Transportation Systems Analyst City of Glendale Transportation Department Glendale, Arizona	1 Year (’05-’06)
Transportation Research Fellow Purdue University West Lafayette, Indiana	2 Years (’03-’05)
Transportation Designer TransCore ITS Tucson, Arizona and Scottsdale, Arizona	3 Years (’00-’03)

Professional Affiliations: Institute of Transportation Engineers (ITE)
International Municipal Signal Association (IMSA)

Summary: Mr. Rhodes is a Senior Traffic Engineer for Advanced Traffic Solutions. Over the past two years, Mr. Rhodes has been deeply involved in the design and operations of two light rail expansion projects within the City of Mesa comprising over 35 signalized intersections.

Projects:

City of Mesa and Valley Metro Light Rail Extension (2016)
Mr. Rhodes was responsible for working with the project team to develop ITS and traffic signal designs for an extension of an existing light rail line.

City of Mesa Traffic Conversion to ATC Standard (2015 to 2016)
Mr. Rhodes guided the transition of the City of Mesa from the NEMA TS2 standard to the ATC (ITS version 2) standard for cabinets and controllers.

City of Mesa Traffic Signal Design Manual (2014)
Mr. Rhodes authored a significant update to the City of Mesa Traffic Signal Design Manual which serves as guidelines to consultants and developers that are creating traffic signal design plans for the City of Mesa. http://www.mesaaz.gov/home/showdocument?id=5184

City of Mesa and Valley Metro Light Rail Extension (2013 to 2016)
Mr. Rhodes was responsible for working with the light rail project team to develop ITS and traffic signal designs for a three-mile extension of an existing light rail line into downtown Mesa, Arizona. Mr. Rhodes also worked closely with the design-build contractor during the construction phase. Finally, Mr. Rhodes was responsible for developing signal timing for the initial opening of the line in August 2015 and continued to work on fine tuning the rail timing into 2016 which eventually resulted in migrating to a more advanced transit controller.

City of Mesa Transit Signal Priority (2011 to 2016)
Mr. Rhodes was responsible for coordination between the City of Mesa's traffic signal operations and transit signal priority with Valley Metro bus routes along Country Club Drive, Main Street, and Power Road. This deployment utilized Econolite ASC/3 controllers.

City of Mesa Light Rail Traffic Signal Priority (2011 to 2016)
Mr. Rhodes was responsible for signal timing and light rail priority at multiple signalized intersections within the City of Mesa. Mr. Rhodes has transit signal priority with Siemens NextPhase, Econolite ASC/3 and Fourth Dimension D4 controllers.

City of Mesa Adaptive Signal Control (2011 to 2016)
Assumed management of an existing SCATS adaptive signal control system in Mesa near a major regional mall and retirement community. Developed a project funded by a CMAQ grant to deploy a new adaptive signal control system in Mesa near a major regional mall, hospital campus and Mesa Community College. Managed the design, construction and implementation of the Kimley-Horn Kadence systems.

City of Mesa Signal Timing (2011 to 2016)
Managed a group consisting of one engineer and two analysts responsible for signal timing within the City of Mesa including responding to citizen complaints, routine re-timing projects and quarterly signal timing

auditing. Created a signal timing audit program to systematically check all signal timing on a routine basis. Personally completed complex signal timing projects including light rail signal timing, transit signal priority, special event timing, diamond interchanges, pedestrian scrambles and pedestrian hybrid beacons.

City of Mesa Special Events (2011 to 2016)
Developed signal timing for special events within the City of Mesa such as festivals in the downtown area, spring training events at Hohokam Stadium (Oakland A's), and the Phoenix-Mesa marathon. Developed traffic signal timing plans and traffic control plans for the new Sloan Park which opened as the Spring Training home for the Chicago Cubs in 2015.

City of Mesa Traffic Signal Maintenance (2011 to 2016)
Mr. Rhodes was responsible for a group of ten foremen and technicians that were responsible for the routine maintenance of traffic signals. Managed a $4.5 million operating budget for maintenance activities. Maintenance program features include maintaining an emergency response time of less than one hour for high priority trouble calls, annual replacement of LED modules on a 10-year cycle, annual pole painting on a 7-year cycle, management of other maintenance activities using both in-house staff and on-call contractors.

City of Mesa Traffic Signal Construction (2011 to 2016)
Mr. Rhodes was responsible for managing a $1.5 million capital improvement program budget used for constructing new signals or re-constructing existing signals. Managed numerous design and construction projects related to traffic signals and ITS such as fiber and conduit construction, pedestrian hybrid beacons, school zone flashers, rectangular rapid flashing beacons, and flashing yellow arrow retrofits.

City of Glendale Signal Timing (2005 to 2011)
Managed and performed all the signal timing work for the City of Glendale including for special events at the City's sports facilities which include an NHL arena and an NFL stadium.

City of Glendale Special Events (2005 to 2011)
Developed traffic control plans for University of Phoenix stadium for the Arizona Cardinal's football games. Developed and supervised traffic control efforts for several national events including five Fiesta Bowls (2007 through 2011), BCS National Championship Game (January 2007), Super Bowl XLII (February 2008), NCAA regional basketball (March 2009), and Wrestlemania XXVI (March 2010).

City of Glendale ITS Projects (2005 to 2011)
Manager of City's Traffic Management Center (TMC) and signal timing efforts. Supervisor for three direct reporting employees including two technicians and one analyst. Reviewed ITS design plans for fiber, conduit, and devices such as CCTV cameras and dynamic message

signs. Monitored Traffic Conditions and Traffic Signals using a central signal system software and CCTV monitoring software. Used Traffic Signal and ITS equipment including traffic signal controllers, video detection, malfunction management units and detector amplifiers. Developed and Implemented Traffic Signal Timing and Coordination. Developed and verified new signal timing plans for correct and safe operations. Participated in a wide variety of other traffic engineering projects as necessary.

Research, Purdue University; West Lafayette, IN (2003 to 2005)
Developed an automated methodology to evaluate detector technology used for presence detection at signalized intersections.

Designer; TransCore; Tucson, AZ & Scottsdale, AZ (2000 to 2003)
Developed signal plans for multiple agencies. Designed traffic control and ITS elements for the US-60 freeway design-build project.

Other Technical Skills:

Controllers
Fourth Dimension D4, Econolite ASC/2, ASC/3, Cobalt, Siemens NextPhase, Siemens SEPAC, Peek 3000, and Transyt 1880.

Systems
Econolite Centracs, Siemens i2TMS, SCATS Adaptive, KITS, and Kadence Adaptive.

Software
Microsoft Word, Microsoft Excel, Microsoft Access, Microsoft Publisher, Microsoft Visio, FileMaker Pro, Camera Cameleon, Iteris Velocity, Luxriot video management system, Barco Wall Control, TrafficWare Synchro and SimTraffic, and TruTraffic.

Publications and Presentations:

Abbas, M., D. Bullock, and A. Rhodes, “Comparative Study of Theoretical, Simulation, and Field Platoon Data,” Traffic Engineering and Control, Vol. 42, No. 7, 2001.

Rhodes, A., D. Bullock, J. Sturdevant, Z. Clark, and D. Candey, “Evaluation of Stop Bar Video Detection Accuracy at Signalized Intersections," *Transportation Research Record*, #1925, TRB, National Research Council, Washington, DC, pp. 134-145, 2005.

Rhodes, A., K. Jennings, and D. Bullock, “Consistencies of Video Detection Activation and De-activation Times between Day and Night Periods,” ASCE Journal of Transportation Engineering, Vol. 133, No. 9, pp. 505-512, September 2007.

Rhodes, A., E. Smaglik, D.M. Bullock and J. Sturdevant, “Operational Performance Comparison of Video Detection Systems,” Proceedings of the 2007 ITE International Annual Meeting and Exhibit, August 5-8, 2007.

Resume for: **Brad Freudenberg**

Title: Software Development Manager

Education: BBA, Business Analysis, Management Information Systems, Texas A&M University, 1994
BBA, Management, Texas A&M University, 1994

Years of Experience: *Twenty-Three Years*

Previous Experience:

Senior Solutions Architect
Advanced Traffic Solutions, LLC
Houston, Texas — Current ('13-'17)

Application Manager
Spark Energy
Houston, Texas — 1 Year ('12-'13)

Directory of Applications / Lead Developer
EPIC Merchant Energy
Houston, Texas — 3 Years ('06-'12)

Project Manager and Consultant
Information Advantage Associates
Houston, Texas — 11 Years ('94-'05)

Summary:

Mr. Freudenberg serves as a Senior Solutions Architect for Advanced Traffic Solutions, a software and traffic engineering company specializing in the development of innovative approaches to complex traffic and transit issues. Leading a team of 3 other developers, Mr. Freudenberg has been involved in the development of recent enhancements to the D4 firmware including implementation of the Indiana Data Logger, migration of code to a single base that can support builds for all supported hardware platforms, implementation of the D4 status monitor, ATC Cabinet, UDOT ATSPM integration, SPaT and many other improvements.

He is an experienced manager and developer with a proven record of successfully implementing new, innovative solutions to meet the needs of a diverse set of agencies. Responsible for mentoring less experienced developers and managers, establishing programming standards, developing new systems, maintaining existing systems, and developing and maintaining relationships with agencies. Skilled in:

• Customer Service
• Resource Management

- System Design
- Database Design
- System Integration
- Programming Standards
- Client Relations
- Software Development
- Scalable, Robust Design
- Cloud Development and Implementation
- SQL
- C#
- VB.Net
- Amazon Web Services
- ETL
- Message Bus Technologies

Projects:

Ring Based Controller (RBC) for VISSIM
Support and updates for the Ring Based Controller (RBC) available in the VISSIM simulation package. The RBC is a stripped-down D4 controller.

Indiana Data Logger
Supervised development of the Indiana Data Logger into the D4 firmware, to collect Hi-Resolution signal data as defined by the State of Indiana enumerations. Developed a non-FTP retrieval solution that simplifies the data retrieval and decoding steps.

D4 Status Monitor
Developed a status monitor application from the ground up. The Status Monitor provides real-time status for network connected D4 controllers to help the agency manage time syncs, communications, and monitoring the health of controllers and field devices.

ATC Cabinet Integration
Managed the D4 ATC cabinet integration allowing Advanced Traffic Solutions to be one of the first companies to have commercially available firmware supporting the new ATC cabinet standards.

Signal Phasing and Timing (SPaT) data for Connected Vehicles
Developed SPaT data in the D4 to communicate to Road Side Equipment (RSE) for projects in Michigan and Virginia.

Third Party Adaptive System Support
Implemented support for third party adaptive systems. Included an innovative approach of writing traffic signal parameters to RAM to mitigate the impacts of constant write cycles to the flash memory.

Other ATS Projects
Improved D4 logging capabilities. Development and testing of new features.

Tab F. Proposed Solutions & Compliance

Compliance to Local Controller Software Requirements

Name and Current Version of Proposed Software

D4 Version 1.5L-18 [1C]

Version History

The following is summary of the significant version history and planned items for future version 1.6 for the D4 local controller firmware.

- Version 1.1 – Initial release of a 16 phase / 16 overlap / 8 transit phase actuated controller
- Version 1.2 – Added soft preemption (sequential preempt operations) along with speed trap / rollback preemption for San Francisco cable cars
- Version 1.3 – Added interconnect, “soft” coordination modes, enhanced transit priority parameter sets during coordination, enhanced yellow trap protection, expanded I/O logic channel capability.
- Version 1.4 – Added support for TS-2 Type 2 and ITS cabinets, enhanced LRV head controls and transit priority modes for LRV’s, enhanced actuated coordination (including phase reservice) along with improved overlap functionality.
- Version 1.5 – Added various data entry diagnostics (pattern data checking), FYA (Flashing Yellow Arrow) module, Pedestrian HAWK, unconditional phase reservice, enhanced preemption modes and conditional exit next mode.
- Version 1.6 – Automated database backups to USB and 2070 datakey (already implemented), overlaps respecting parent phases during pre-emption by default (already implemented), EVP left-turn logging (already implemented), support for 40 weekly time-of-day schedules (requires development), request upload from controller to central (requires development), timeout value for front panel calls (requires development), alternate all-red (requires development), and DHCP (requires development).

Development Roadmap

The D4 meets most requirements of this RFP but some development will be required. We have already acted on some of the key items that will benefit our current users for Version 1.6. The remaining items addressed in this section are more specific for this RFP and/or will take additional time to develop and test and may require coordination with the City and others such as support for remote upload to the central system, timeouts for calls placed via the front panel, alternative clearances based on external input, and Dynamic Host Configuration Protocol (DHCP).

We have the framework in place and the knowledge necessary to rapidly and efficiently implement the remainder of the requirements. Our team prides ourselves in providing custom software for our users which are configured as part of the installation process. This allows us to test one version of the code across all platforms which are then modified during installation for each agency in order meet their specific requirements.

Rather than develop a schedule showing the weeks or dates that we plan to work on a feature, we plan everything by release such that it is ready by the date specified. This allows us to stay efficient in the planning process and not be confined to an arbitrary schedule that is insignificant. The final release is always the target. Typically, a Beta version will be provided to interested

agencies before the release date for those that wish to provide comments on the new functionality prior to the official release.

The few requirements requiring further development for this RFP are envisioned to take approximately 4 months. Details regarding each of the enhancements are identified in the compliance matrix. Our planned release schedule is shown in the schedule section below which includes time for planning, design, implementation, testing and final release to the customer.

Number of Field Deployments

The D4 software is presently deployed at more than 5,000 locations in Arizona, California, Michigan, Texas, Virginia and Canada. Our team works with multiple hardware platforms (OS9 / Linux) and central system providers (4) as part of our current projects. Hence the D4 firmware is proven commercial off the shelf (COTS) product and offers the “best value” given the range of hardware and central system providers that are supported. Selecting other options for local controller firmware can significantly increase costs for other components and/or minimize the number of hardware or central system options that are available to the agency.

Software Warranty

The D4 software warranty includes new functionality and software fixes throughout the initial warranty period and into any ongoing annual maintenance / support agreements. Critical bug fixes are also provided to users throughout the life of the software regardless of the status of annual maintenance agreements.

We have also carefully made each subsequent version of D4 backwards compatible with the last, meaning that the agency can use an older database format with the latest version of D4 or vice-versa. In this case, any new features would need to be programmed separately but the common items will be transferred. In the reverse case, any items not in the older version of D4 will be ignored but the rest will transfer. Our supporting utilities also work the same with the OS-9 and Linux versions of D4, Hence the agency will not have to create new databases to support a new version of firmware. All MIBs, software documentation, and release notes will be provided with new release of firmware as appropriate.

Some advanced features, such as Connected Vehicles are typically not included in the base software considering they were significant software development efforts that are ongoing and typically not required by most users. If such features were to become an industry standard we would typically begin including them along with the base software.

NTCIP Compliance

Our team complies with the National Transportation Communication for Intelligent Transportation Protocol (NTCIP) Standards specified in this RFP.

Additional Functionality Provided

All functionality of the base D4 local software is included at no charge even if not specified in this RFP. Future functionality added to the base local D4 software is provided to any agency that is currently on a software maintenance agreement. Some of the notable functionality not mentioned in the RFP is tabulated below:

- Advanced transit priority and peer-to-peer features developed over the past 13 years and field tested.
- Multiple coordination and pedestrian permissive modes.
- Front panel access through personal computer or tablet.

- Automatic yellow-trap protection, including during preempt.
- Automatic checking of MMU programming based on controller programming.
- Support for UDOT Advanced Traffic Signal Performance Measures.

Transit Signal Priority

The D4 supports the City of Austin's current method of using Special Function commands from central to activate Transit Signal Priority (TSP). Special functions commanded by central can be mapped in the controller to provide priority service to any of 8 transit movements. In lieu of using an additional phase to grant the priority extension we would recommend using the built-in priority functions of the D4 controller. This would allow the City of Austin to use any of the advanced transit priority features of the D4 which provide more options for the agency to consider when setting up TSP.

The D4 supports extended green (among many other TSP strategies) and allows the user to define a limit to this extension. The existing 6-second extension can be accommodated under both coordination and free modes. Alternative limits to green extensions could be defined by plan. The D4 also includes a travel timer that when configured can allow the controller to intelligently decide whether an extension is appropriate or not. In this case, the controller can avoid an unnecessary priority extension in the situation where the transit vehicle would not make it through green even with the extension. These travel times are adjustable by time-of-day and the controller can tune the travel times automatically by using the built-in transit priority adaptive modes which are included in the base software.

The D4 supports up to 8 transit priority movements with unique transit parameters for each and therefore can support the expansion of the Austin TSP system. Depending on the bus's passenger count, the D4 can be configured to run unique transit parameters for each situation which could allow a more generous extension value when the bus has higher ridership.

The D4 also has many advanced transit features that may be of interest to the City of Austin and City of San Antonio down the road. We support many different TSP strategies (which may or may not be appropriate depending on the specific situation) such as phase extend, phase truncation, phase omit, pedestrian omit, phase reorder and drop free. Any of the TSP strategies and parameters can be changed by time-of-day. Some TSP parameters are adaptable meaning they can tune themselves automatically based on field conditions. The TSP functionality in the D4 controller far surpasses the Prioritor options available in NextPhase 1.7.7 and therefore the cities can be assured that they will have much more flexible and powerful TSP functionality available to them with the D4 firmware.

We have a lot of experience working with Kimley-Horn integrating our software into KITS and have successfully with KITS on other projects across the United States and Canada. We are committed to the continued seamless integration of the D4 local software with this system including the required transit priority and preempt functionality. Our company and staff have significant experience deploying TSP systems in a variety of agencies across the country including San Francisco, CA; Salt Lake City, UT; Sacramento, CA; San Jose, CA; Long Beach, CA; Houston, TX; Chandler, AZ; and Mesa, AZ.

Emergency Vehicle Preemption

The D4 also supports the use of preempt inputs commanded directly by central to activate emergency vehicle preemption inputs. The special function can be converted to a preemption input and a normal preemption sequence can be executed. Kimley-Horn is a partner that we frequently work with and we would look forward to working with them again to get this

functionality implemented by ensuring that both the KITS system and the D4 local software have the features needed for implementation. The D4 supports many advanced preemption features such as full control over the exit sequence of the preempt including the ability to exit right into coordination. Central based emergency vehicle priority could also be an option in the future.

Plan to Meet Mandatory Functional Requirements

Upon receiving the project, we would immediately initiate dialogue with the City of Austin to ensure that we fully understand the requirements of the items that we do not currently meet. By working together and exchanging ideas we can get features implemented right the first time. Since we are located in Houston, any of our staff including software developers are available to travel to Austin for these meetings which may be more effective face-to-face.

After clarifying any requirements, we would fine tune the development schedule and share any changes with the City of Austin. Software development would begin immediately as we would plan to have our software developers free to support this important project. We have four full time developers in the Houston area that would be assigned to this work to meet the schedule.

List of Features that Exceed Minimum Requirements

There are a number of “functional” parameters that are part of the standard release which far exceed many of the requirements contained herein. This section highlights such areas and shows where additional functionality is available as part of the standard release. Key areas include selectable cabinet type (where all types are part of the standard database), ability to talk to TS-2 detection systems in 332, ITS and ATC cabinets, forward thinking pedestrian HAWK and diamond interchange operations, pedestrian scramble configuration (without the need for overlaps), advanced support for transit phases and transit signal priority, 2 trail green settings per overlap, and advanced preempt exit modes to name a few. A summary is listed below:

- User selectable cabinet types (where all cabinet types part of the database).
- Proven history of talking to TS-2 detection systems in 332, ITS and ATC cabinets.
- Source of vehicle call / pedestrian call is also indicated in the status display.
- Alternate timing tables allow parameters with non-zero values to override default values. The key here is the entire phase timing values do not have to be reentered reducing the potential for errors.
- Conditional service minimum and maximum timing can vary per plan.
- Three pedestrian permissive modes are provided (yield, partial, and omit).
- Pedestrian scrambles are easily programmed without the use of overlaps.
- More granular control over dual entry (supported per phase rather than per ring).
- Transit warning signs provide 5 different user selectable modes.
- Ability to do overlap walk rest with actuated phases in-between.
- D4 offers 5 different Pedestrian Hybrid Beacon modes including flash delay/carryover.
- D4 allows pedestrian service times that are longer than the split time for a phase in a coordination pattern. The D4 also has built-in strategies to avoid going into transition when the pedestrian phase is served by adjusting splits prior to (in anticipation of) a pedestrian service or following a pedestrian phase. The user is given complete control over how these phases are adjusted. These are typically a more graceful way to handle these situations rather than simply going free or going into transition.
- Adaptive splits and the range of allowed splits is entirely user customizable.
- Multiple priority modes are user configurable and changeable by time-of-day.
- Fully customizable how the controller will treat non-priority and priority phases during TSP. The user can control the degree of truncation of phases preceding a priority phase and can also control how phases are served during the recovery cycle.

- All TSP parameters are user configurable. The TSP module is not a black box.
- Peer-to-peer support for transit signal priority and remote transit detectors.
- Coordination patterns allow user control over transition values avoiding short phases etc.
- Multiple coordination permissive modes, all of which are user configurable.
- Floating force-offs with a float green parameter allowing user control over how additional time gets distributed.
- Extremely efficient transition algorithms that reduce the impacts of transition and very helpful in supporting adaptive signal control.
- Preempts have 6 exit modes including return in step and variations of returning to where the controller left off relative to the start of preempt. D4 also has 4 soft preempts with 8 steps each for more discrete control.
- Advanced warning flashers automatically supported.
- Built-in yellow trap avoidance (including during preempt)
- Independent validation of the conflict monitor programming in TS-2, ITS and ATC cabinets, thereby alerting the user of any permissives in the conflict monitor that are over jumpered based on current controller programming.

Compliance Matrix

The D4 firmware Compliance Matrix begins on the next page.

Category ID	Requirement/Description	Mandatory	Desired	Currently Available	Available with Config-uration	Cannot be Provided as Part of the Project	Comments
1	**GENERAL Local Controller Software shall:**						
1.1	Be menu driven with all parameters allowed to be programmed through direct keyboard interface. Because of the complexity of software there shall be a minimum of ten programmable short-cut keys to access user defined screens.	Mandatory		✔			D4 supports short-cut keys. Menus can be accessed via front panel, database editor, telnet, or central system.
1.2	All controller functions shall be accessible and editable by means of menus. All menu items shall be labeled in plain English. Likewise, all elements in data tables and displays shall be clearly labeled in English. Hexadecimal numbers are not permitted in any display.	Mandatory		✔			Hexadecimal numbers are not required to program any controller functionality. Hexadecimal numbers are used in certain status display screens and checksums (SDLC Frames, Controller Checksum, Database Checksum etc.)
1.3	Where dynamic displays are used to indicate the duration of a controller phase, function, or output they shall count upward, starting at zero. At a minimum dynamic displays for minimum green, maximum green, yellow, all red, local cycle counter, master cycle counter, and phase.	Mandatory		✔			The local cycle counter and master cycle counter count upward from zero. Typically, the other types of counters countdown to zero; however an alternate status display can be customized for this proposal to show the City parameters in the format they wish.
1.4	Cycle counters shall count up to a value equal to the length of the current cycle minus one, then return to zero and begin counting up again	Mandatory		✔			Supported.
1.5	Gap timers shall count downward, starting at the programmed or, when gap reduction is used, calculated gap time	Mandatory		✔			Supported.
1.6	Have features that will allow the controller database to be backed up to internal memory, USB Flash Drive, and DataKey.	Mandatory		✔			Supported.
1.7	The software shall run on LINUX-based 2070-1C cards. It desirable, but not a requirement, that the software support legacy 2070 controllers with 1B and 1E CPU cards. Respondent shall indicate options, and limitations with either. Local Controller Software shall run on the following Manufacturer CPU cards:	Mandatory		✔			All features are supported on Linux. Some newer features such as the Indiana data logger may be unavailable on OS-9.
1.7.1	Econolite	Mandatory		✔			OS-9 and Linux Supported.
1.7.2	Intelight	Mandatory		✔			OS-9 and Linux Supported.
1.7.3	McCain	Mandatory		✔			OS-9 and Linux Supported.
1.7.4	Peek/formerly “Quixote”	Mandatory		✔			Linux Supported.
1.7.5	Safetran	Mandatory		✔			OS-9 and Linux Supported.
1.7.6	Siemens	Mandatory		✔			OS-9 and Linux Supported.
1.8	Use the following I/O configurations on the 2070		Desired	✔			Supported.
1.8.1	2070-2A		Desired	✔			Supported.
1.8.2	2070-2B		Desired	✔			Supported.
1.8.3	2020-2E		Desired	✔			Supported.
1.8.4	2070-2N		Desired	✔			Supported.
1.8.5	2070-2S		Desired	✔			Supported.
1.9	Proposed Local Controller Software must be able to use Network Time Protocol for proper time synchronization. GPS reference should also be supported for time clock synchronization.	Mandatory		✔			Network Time Protocol and the NMEA 0183 protocol for syncing the controller clock to GPS devices at locations with no communications are supported.
1.10	The Local Controller Software shall allow data to be entered from a personal computer, Ethernet port, or serial port.	Mandatory		✔			Can be configured via the central system or database editor via serial or Ethernet.

Category ID	Requirement/Description	Mandatory	Desired	Currently Available	Available with Config-uration	Cannot be Provided as Part of the Project	Comments
1	**GENERAL (cont.) Local Controller Software shall:**						
1.11	Data entry and modification shall be accessible via an web-enabled interface hosted on the local controller and accessible via the controller's programmed IP address or host name when on an IP network.		Desired			✔	We currently support intersection status via a web browser. Data entry / modification is also available on the network via telnet. We have explored the web based option and have discovered several limitations to this approach. The capabilities of the hosted interface will vary depending on controller hardware therefore functionality demonstrated on one hardware platform may vary or be unavailable on another hardware platform. We propose to meet this capability alternatively through telnet and through a desktop based database editor which we believe will enhance the user experience and will support all of the hardware types required in this RFP.
1.12	The Local Controller Software shall support export of the parameter database in a format that supports copy/paste		Desired	✔			This functionality is supported between KITS and D4.
1.13	A backup method should be provided that would allow immediate reloading of all the controller's parameters via the front panel. The parameters should be backed up onto a nonvolatile memory device (such as the 2070 datakey and USB). Changes made to the controller timing should be able to be automatically backed up to the key when changed from the central system.		Desired	✔			Automatic backup to 2070 datakey and/or USB key has already been added to the software for this RFP. The data is automatically written after a user settable timeout period so that constants writes are not occurring. Changes are backed up regardless of source (front panel change, central system, database editor).
1.14	The Local Controller Software shall be able to hold multiple full database copies that can be switched by selection on the front panel.		Desired	✔			Up to 16 databases can be loaded onto the controller for selection from the front panel.
1.15	The Local Controller Software shall support the following cabinet types:	Mandatory		✔			Supported.
1.15.1	NEMA TS-1	Mandatory		✔			Supported.
1.15.2	NEMA TS-2	Mandatory		✔			Supported.
1.15.3	Caltrans 332	Mandatory		✔			Supported.
1.15.4	Caltrans 336	Mandatory		✔			Supported.
1.15.5	ITS	Mandatory		✔			Supported.
1.15.6	ATC	Mandatory		✔			Supported.
1.16	The Local Controller Software shall be able to request a full database download from central from the front panel.		Desired	✔			Supported.
1.17	The Local Controller Software shall be able to request a full database upload to central from the front panel.		Desired		✔		This will require some coordination with the central system vendor and may require development on that side. We work frequently with Kimley-Horn on integration into KITS and we commit to work with them on implementing this feature.
2	**DISPLAY**						
2.1	The Local Controller Software shall provide indications to facilitate the determination of the operation. The indications shall include the following:	Mandatory		✔			Supported.
2.1.1	Phase or phases in service	Mandatory		✔			Supported.
2.1.2	Phases or phases next to be serviced	Mandatory		✔			The D4 will indicate the phase(s) currently selected as next with a lower case n. The lower case n will change to an upper case N when the current phase is terminating. The D4 can change phase next decisions during the clearance interval (user configurable).
2.1.3	Presence of a vehicle call	Mandatory		✔			The D4 indicates a vehicle call and also distinguishes the source of the vehicle call (i.e. max recall, min recall, detector call, locked detector call, peer logic call, or central system call). The status may toggle between two different indications per phase if a phase has a call from more than one source.

Category ID	Requirement/Description	Mandatory	Desired	Currently Available	Available with Config-uration	Cannot be Provided as Part of the Project	Comments
2	**DISPLAY**						
2.1.4	Presence of a pedestrian call	Mandatory		✔			The D4 indicates a pedestrian call and also distinguishes the source of the pedestrian call (i.e. ped recall, locked ped detector, peer logic call, or central system call). The status may toggle between two different indications per phase if a phase has a call from more than one source.
2.2	The Local Controller Software shall provide for the simultaneous presentation for all phases		Desired	✔			Phase status for all phases are presented on the main status display screen (M-0-1).
2.3	The Local Controller Software shall provide indications to indicate the status of each active phase in the ring. These indications shall include the following:	Mandatory		✔			Supported.
2.3.1	Initial	Mandatory		✔			Supported.
2.3.2	Extension	Mandatory		✔			Supported.
2.3.3	Yellow Change	Mandatory		✔			Supported.
2.3.4	Red Clearance	Mandatory		✔			Supported.
2.3.5	Walk	Mandatory		✔			Supported.
2.3.6	Pedestrian Clearance	Mandatory		✔			Supported.
2.3.7	Green termination through Gap-out	Mandatory		✔			Supported.
2.3.8	Green termination through Maximum time-out	Mandatory		✔			Supported.
2.3.9	Green termination through Force-off	Mandatory		✔			Supported.
2.3.10	Rest State	Mandatory		✔			Supported.
3	**SECURITY Local Controller Software shall:**						
3.1	Not require any “hardware” lock to operate.	Mandatory		✔			Hardware locks have never been used in the D4.
3.2	Local Controller Software shall be provided with incremental password protection.	Mandatory		✔			Supported.
4	**VEHICULAR/PEDESTRIAN/BICYCLE PHASES**						
4.1	Local Controller Software shall be provided with a minimum sixteen phases. Each phase shall have a minimum of three maximum times per phase, with dynamic max operation capability.	Mandatory		✔			Max I, Max II and Max III are available in the D4. Max III is used as the upper limit when using dynamic maximum green.
4.2	The Local Controller Software shall provide at least 4 concurrently timing rings. The initial default setup for the rings, barriers, and phases shall follow the standard NEMA eight-phase, dual-ring configuration	Mandatory		✔			Each of the four rings can be assigned to either ring group 1 or ring group 2. The two ring groups can operate independently of each other and provides a method of running two intersections from one controller.
4.3	The Local Controller Software shall provide multiple gap/passage, max greens, and pedestrian times, all TOD selectable.		Desired	✔			Alternate timing is selectable per plan and includes passage, max green, and ped times. Only parameters with non-zero values are observed from the alternate timing table meaning that users do not have to reenter an entire timing table to change one parameter.
4.4	Each phase will have minimum, maximum and soft recall modes.	Mandatory		✔			Supported. Selectable by unit, time of day or per plan.
4.5	Local Controller Software shall provide early and delayed walk timing via program entry without using any additional logic or dummy phase.	Mandatory		✔			Standard feature, logic and dummy phases are not required. Can also be configured globally in the base timing or on a per plan basis.
4.6	Local Controller Software shall provide pedestrian clearance through yellow/red (configurable from end of red).	Mandatory		✔			Supported. End of pedestrian clearance is user configurable from end of red.
4.7	Local Controller Software shall provide conditional service during free and coordinated operation, with conditional service minimum and maximum green times.	Mandatory		✔			Supported for both free and coordinated operation. During coordinated operation the conditional service minimum and maximum timing can vary on a per phase per plan basis.
4.8	Local Controller Software shall provide manual control operation with selectable call, omit, sync and protected pedestrian clearance phases.	Mandatory		✔			D4 was the first to support this with the goal of improving efficiency during police control during event traffic. This is currently in use near the Woodlands Pavilion in Montgomery County.

Category ID	Requirement/Description	Mandatory	Desired	Currently Available	Available with Config-uration	Cannot be Provided as Part of the Project	Comments
4	**VEHICULAR/PEDESTRIAN/BICYCLE PHASES (cont.)**						
4.9	Local Controller Software shall provide per phase preempt timing (vehicle and pedestrian).		Desired	✔			This is controlled globally per preempt or can be set on a per phase basis in the base timing table. The per phase settings will override.
4.10	Local Controller Software shall provide ability to change Phase Next decision during Phase Clearances.	Mandatory		✔			D4 does this automatically provided the next phase is not part of an overlap.
4.11	Local Controller Software shall provide pedestrian recycle modes provided for late/multiple service opportunities.		Desired	✔			Ped recycle can be set globally or on a per plan basis. Ped permissives (yield, partial, and omit) are set per plan.
4.12	Local Controller Software shall provide for exclusive pedestrian timing, such that all pedestrian phases to display "WALK", allowing diagonal pedestrian crossing.		Desired	✔			D4 has a ped scramble option where all phase pedestrian movements will display a WALK without the need for overlaps. When the max scramble walk option is also selected the completion of all PCLR's will end at the same time, meaning the shorter crossings will display the WALK longer. The exclusive ped can be enabled / disabled via plan or TOD Function.
4.13	Local Controller Software shall provide for any pedestrian phase to be assigned as an exclusive phase, all other vehicular phases displaying red.		Desired	✔			See Category 4.12.
4.14	Menu selectable operational templates for 4-phase, 3- phase, lag/lead and lead/lag diamond phasing shall be provided.		Desired	✔			These exist and can be pre-loaded as part of the 16 custom databases that are available.
4.15	Where NTCIP 1202 specifies that a parameter shall be programmable in increments of 0.1 seconds, then the controller display shall likewise display it in increments of 0.1 seconds. Otherwise, data shall be displayed in increments of one second.		Desired	✔			Supported.
4.16	Simultaneous Gap Out shall allow the user to ensure that defined phases which will terminate, must simultaneously reach a point of being committed to terminate before Green timing termination shall begin.	Mandatory		✔			By default simultaneous gap as defined here is used.
4.16.1	Simultaneous Gap Out shall be enabled/disabled via program entry	Mandatory		✔			The user can disable simultaneous gap (allow phases crossing the barrier to gap independently) by programming the no simultaneous gap parameter.
4.17	Dual Entry provides that one phase in each ring must be in service, subject to compatibility, at all times		Desired	✔			Supported.
4.17.1	Dual Entry shall be selectable via program entry in the ring to be active		Desired	✔			Dual Entry is supported per phase.
4.18	Red Revert – The Local Controller Software shall provide a minimum red indication ranging from 2-6 seconds following the Yellow Change interval and prior to the next display of Green on the same phase.		Desired	✔			Red revert can be set in a range of 0 to 25.5 seconds per NTCIP. This parameter can also be set globally in the unit options.
4.19	The Local Controller Software shall support Dallas Phasing and the Arlington Phasing.	Mandatory		✔			Supported using overlaps.
4.20	The Local Controller Software shall be capable of providing fully actuated and fixed time diamond interchange operation. The Local Controller Software shall be able to implement diamond operation as defined in section 11170.6 part E of the Texas Department of Transportation "Departmental Materials Specification 11170 – Fully Actuated, Solid-State Traffic Controller Assembly" dated July 2012.The Local Controller Software shall support the following diamond interchange operations:		Desired	✔			All diamond modes are supported.
4.20.1	Figure 3 - Three Phase (Lag-Lag)		Desired	✔			Supported.
4.20.2	Figure 6 – Three Phase Variation (Lead-Lag)		Desired	✔			Supported.
4.20.3	Figure 7 – Three Phase Variation (Lag-Lead)		Desired	✔			Supported.
4.20.4	Figure 4 – Four Phase w/ Overlaps (TTI Phasing)		Desired	✔			Supported.

Category ID	Requirement/Description	Mandatory	Desired	Currently Available	Available with Config-uration	Cannot be Provided as Part of the Project	Comments
4	**VEHICULAR/PEDESTRIAN/BICYCLE PHASES (cont.)**						
4.20.5	Three Level Diamond Four Phase with Four Overlaps		Desired	✔			Supported.
4.21	The Local Controller Software shall be capable of adding custom predefined patterns that can be saved to be used on any controller. The Local Controller Software shall support the following custom predefined patterns:	Mandatory		✔			The Flexible nature of the D4 controller gives the user a lot of control and options when phasing complex and/or unusual intersections. All of the intersection types presented here can be programmed in the D4.
4.21.1	SPUI	Mandatory		✔			Supported.
4.21.2	DLT	Mandatory		✔			Supported.
4.21.3	DDI	Mandatory		✔			Supported.
4.22	The Local Controller Software shall have an option for a separate minimum green time, red revert, and advanced warning flasher for bicycles.	Mandatory		✔			Bike minimum green time supported. Additional information is needed on how red revert and advanced warning flashers for bicycles are used. Red revert can be set per phase so exclusive bicycle phases could have their own red revert. D4 also supports advanced warning flashers on a per phase basis.
4.23	The Local Controller Software shall have an option for a separate passage time for bicycles.		Desired	✔			Each bicycle detector has a separate passage time.
4.24	The Local Controller Software shall have an extended button press option to lengthen walk times.		Desired	✔			Supported.
4.25	The Local Controller Software shall a safeguard to prevent the pedestrian phases from extending clearance phases at diamond interchanges.		Desired	✔			Supported.
4.26	The Local Controller Software shall have an option for variable initial green time, with the following parameters:		Desired	✔			Supported.
4.26.1	Added initial green time		Desired	✔			Supported.
4.26.2	Maximum initial green time		Desired	✔			Supported.
4.27	The Local Controller Software shall have an option for gap reduction, with the following parameters:		Desired	✔			Supported.
4.27.1	Time-Before-Reduction		Desired	✔			This parameter is called Reduce After in the D4.
4.27.2	Time-To-Reduce		Desired	✔			Supported.
4.27.3	Minimum Gap		Desired	✔			Supported.
5	**TRANSIT PHASING - Local Controller Software shall provide:**						
5.1	Minimum of eight transit phases.	Mandatory		✔			D4 has 8 transit phases that can be assigned to any of 5 priority schemes.
5.2	Transit phases to support two or three section control heads for bus/train indications.	Mandatory		✔			LRV output controls are configured per transit phase under the cabinet menu.
5.3	Advanced warning signal control per transit phase (solid or flashing indications).	Mandatory		✔			Each transit phase has an associated sign that can be solid or flashing and mapped to any output. The transit phase can illuminate signs for other transit phase(s) based on the user programming for the active transit phase. Signs can illuminate based on travel time away or phase status.
5.4	Actuated or recall operation.	Mandatory		✔			Default mode for each transit phase is recall. Locked, non-lock and soft recall are the actuated options.

Category ID	Requirement/Description	Mandatory	Desired	Currently Available	Available with Config-uration	Cannot be Provided as Part of the Project	Comments
5	**TRANSIT PHASING - Local Controller Software shall provide:**						
5.5	Normal or priority based service.	Mandatory		✔			Default mode for each transit phase is no priority, but early/extend, extend only, reservice, drop free, and drop free in step are other options.
6	**RINGS**						
6.1	Minimum of four rings (Single Intersection or two independent intersections).	Mandatory		✔			Supported.
6.2	Each of the four rings can be assigned to one of the two ring-groups.		Desired	✔			Any of the four rings and be assigned to any of two ring groups (two intersections).
7	**OVERLAPS**						
7.1	The Local Controller Software shall provide internally generated Overlaps	Mandatory		✔			Supported.
7.2	The Local Controller Software shall provide a minimum of sixteen timed Overlaps.	Mandatory		✔			Supported.
7.3	The Local Controller Software shall provide vehicle and pedestrian movements for each overlap.	Mandatory		✔			Supported.
7.4	The Local Controller Software shall provide actuated pedestrian movements for each overlap.	Mandatory		✔			Overlap pedestrian movements can be recalled or actuated with optional selectable pedestrian overlap start phases that control which of the parent phases the overlap walk can begin.
7.5	The Local Controller Software shall provide early and delayed walk timing for each overlap.	Mandatory		✔			Supported per overlap.
7.6	The Local Controller Software shall provide pedestrian rest-in-walk across multiple phases.	Mandatory		✔			Via overlap walk rest, walk thru / walk halt options. Can span actuated phases if a fixed time / coordinated parent phase is eventually next.
7.7	The Local Controller Software shall provide per overlap preempt timing (vehicle and pedestrian).	Mandatory		✔			Overlap operation is adjustable per preempt and each of the preempt intervals (track clear and dwell).
7.8	Each Overlap shall have its own timing parameters	Mandatory		✔			Each overlap has unique minimum green, trailing green, delay green, yellow, red, red revert, walk, pedestrian clearance, solid don't walk, early walk, delayed walk, and preempt timing.
7.9	Each overlap output shall be configurable to display any of the three output colors.	Mandatory		✔			Each overlap has the following outputs: Overlap Green, Overlap Yellow, Overlap Red, Overlap Walk, Overlap Don't Walk and Overlap Ped Clear.
7.10	Each overlap output shall be configurable to be dark	Mandatory		✔			Supported.
7.11	In addition to defining parent phases, overlaps should be configurable with the following parameters that impact their operation:	Mandatory		✔			Supported.
7.11.1	Negative pedestrian phases	Mandatory		✔			Supported.
7.11.1	Negative vehicle phases	Mandatory		✔			Supported.
7.11.1	Negative overlaps	Mandatory		✔			Supported.
7.12	If a negative vehicle or pedestrian phase is next and the overlap is green, the overlap should terminate and time its yellow change and red clearance interval before the negative phase displays green.	Mandatory		✔			Supported.
7.13	If a negative overlap is green when an overlap would normally be turning green then the overlap that is set to turn green will remain in red until the negative overlap has terminated.		Desired	✔			Supported.
8	**FLASHING YELLOW ARROW (FYA)**						
8.1	The Local Controller Software shall support Flashing Yellow operation for left turn protective/permissive operation. The output of the flashing yellow arrow movement shall be configurable across two load switch outputs.	Mandatory		✔			The D4 FYA module supports up to 8 FYA / FRA's. FYA outputs are completely user configurable in the cabinet menu.

Category ID	Requirement/Description	Mandatory	Desired	Currently Available	Available with Config-uration	Cannot be Provided as Part of the Project	Comments
8	**FLASHING YELLOW ARROW (FYA) (cont.)**						
8.2	The Local Controller Software shall provide FYA separate from overlaps.	Mandatory		✔			The FYA module is separate from the 16 overlaps.
8.3	FYA detector logic shall be automatically selected by FYA type selection.	Mandatory		✔			D4 supports two different FYA detector modes each of which change their delay and extend settings automatically based on the current mode of the associated FYA.
8.4	Program for start phase, opposing pedestrian movements, delay and skip red options.	Mandatory		✔			All options supported for each of the 8 FYA/FRAs.
8.5	It should be possible to omit the flashing yellow arrow by time-of-day	Mandatory		✔			The D4 allows the FYA to be omitted by time-of-day or by coordination pattern without creating a yellow trap.
8.6	It should be possible to omit the protected green arrow by time-of-day	Mandatory		✔			The D4 allows a phase (the protected green arrow in this case) to be omitted by time-of-day or by coordination pattern.
8.7	It should be possible to omit the flashing yellow arrow when a "conflicting" pedestrian phase is timing its WALK or DON'T WALK interval. The flashing yellow arrow should resume flashing when the pedestrian interval has completed. The minimum green time (programmed concurrently with the flashing yellow arrow) must be met in this scenario. This should be accomplished via program entry without using any additional logic or dummy phase.	Mandatory		✔			This is easily programmed in the D4 by simply indicating for each FYA which ped phase(s) should suppress the FYA. Each FYA has a programmable minimum FYA time.
8.8	The Local Controller Software shall allow programming of to omit the display of the red arrow when going from the protected condition to the permitted condition of the left turn display. In these cases the flashing yellow arrow would begin immediately after the solid yellow arrow completes its timing and remaining flashing through the programmed all-red clearance interval and the opposing green.	Mandatory		✔			The D4 allows the omission of the red clearance (when transitioning from protected to permissive) on a per FYA basis.
9	**PEDESTRIAN HYBRID BEACON (PHB) MODULE - The Local Controller Software shall provide**						
9.1	Various operational modes with flash and carryover.	Mandatory		✔			D4 supports 5 different PHB operational modes with flash delay and carryover options.
9.2	One or more can run independently with second ring group.	Mandatory		✔			The PHB can run in one or both ring groups. The second ring group can run free or use a different coordinated offset than the first group.
9.3	The Local Controller Software shall have the ability to specify points in a cycle where a pedestrian call will not be served.	Mandatory		✔			The PHB can run in coordination just like a normal signal and therefore all of the features available to control service are present.
10	**GENERAL DETECTION - The Local Controller Software shall provide**						
10.1	Minimum of sixty-four vehicle detectors.	Mandatory		✔			Supported.
10.2	The Local Controller Software shall support speed, occupancy, and presence detection	Mandatory		✔			The D4 supports occupancy, presence and speed trap/wrong way detection.
10.3	Each vehicle detector inputs shall be assignable to any one or more phases, via program entry	Mandatory		✔			Any detector can be assigned to any combination of phases.
10.4	Programmable call and extend phases.	Mandatory		✔			D4 detectors can call and/or extend one or more of the 16 phases that are present.
10.5	Delay and extend timing.	Mandatory		✔			Delay and extend timing is configured per detector.
10.6	Stop-bar disconnect mode with carryover (extend) timer.	Mandatory		✔			This mode in D4 allows a shorter passage time to be used for stop-bar detectors assuming dilemma zone detectors are present.
10.7	Stop bar disconnect mode for stop bar verse advanced detection.	Mandatory		✔			Based on the mode in 10.6 the greater passage time (stop-bar or advanced) will be shown on the main timing status display.
10.8	Detector cross switching.	Mandatory		✔			Supported for the each of the 64 detectors. One or more switch phases can be selected for each detector.

Category ID	*Requirement/Description*	*Mandatory*	*Desired*	*Currently Available*	*Available with Config-uration*	*Cannot be Provided as Part of the Project*	*Comments*
10	**GENERAL DETECTION (cont.) - The Local Controller Software shall provide**						
10.9	No presence/max fail detector diagnostics that can be disabled by TOD.	Mandatory		✔			D4 supports both modes (in minutes) configurable on a per detector basis. Erratic counts (pulses/minute), is also supported along with fail mode and fail time options.
10.10	A minimum of 16 Vehicle Detectors shall be assignable to a system detector function, via program entry	Mandatory		✔			Any of the 64 vehicle detectors can also be enabled as a system detector. Up to 16 detectors can be logged locally into 15-minute bins with the local log holding up to 6000 bins (62.5 days of 15 minute volume/occupancy logs for 16 detectors).
10.11	Provision for Storing a Demand – The Local Controller Software shall support the following provisions for storing a demand:	Mandatory		✔			Supported.
10.11.1	The storing of a call for vehicle service on each vehicle phase when that phase is not displaying a Green indication.	Mandatory		✔			By default, vehicle calls are only placed to a phase when the detector is on. Each vehicle detector can be programmed for locking to hold the call until the vehicle phase turns green. There are two locking options: Yellow Lock will lock any call received when the phase is not green and Red Lock will lock any call received when the phase is red.
10.11.2	The storing of a call for pedestrian service on phases equipped with pedestrian time setting, when that phase is not displaying a Walk indication	Mandatory		✔			By default, pedestrian calls are locked until the pedestrian phase is serviced.
10.12	Placement of Maximum Recall – The Local Controller Software shall allow, via program entry, the ability to place a call on a phase such that the Green interval shall be extended to the Maximum Green Time. The programming of recall should be available as a global setting for a phase as well as on a per plan basis.	Mandatory		✔			Maximum recalls can be programmed as a global setting, per coordination plan, or by time-of-day.
10.13	Placement of Minimum Recall – The Local Controller Software shall allow, via program entry, the ability to place a recurring demand for vehicle service on any phase when that phase is not in Green interval. The programming of recall should be available as a global setting for a phase as well as on a per plan basis.	Mandatory		✔			Minimum recalls can be programmed as a global setting, per coordination plan, or by time-of-day.
10.14	Placement of Pedestrian Recall – The Local Controller Software shall allow, via program entry, the ability to place a recurring pedestrian call which shall function in the same manner as an external pedestrian call, except that it shall not recycle the pedestrian service until a conflicting phase is serviced. The programming of recall should be available as a global setting for a phase as well as on a per plan basis.	Mandatory		✔			Pedestrian recalls can be programmed as a global setting, per coordination plan, or by time-of-day. The pedestrian phase will not recycle until a conflicting phase is serviced.
10.15	Placement of Call at Phase Termination – The Local Controller Software shall have the user configurable ability to place a call on a terminating phase when the terminating phase has remaining time in the Passage Time.		Desired	✔			By default, a locked call is placed on any phase that is still extending when it terminates. This default behavior can be modified on a per phase basis by selecting the No Term Call parameter.
10.16	Conditional Service – The Local Controller Software shall provide conditional service phase selection, via program entry.		Desired	✔			Supported for both free and coordinated operation. During coordinated operation the conditional service minimum and maximum timing can vary on a per phase per plan basis. Conditional service can be programmed as a global setting, per coordination plan, or by time-of-day.
10.17	The Local Controller Software shall collect high-density data. The data should be able to be stored locally for 30 days to be retrieved when a communication link is reestablished.	Mandatory		✔			Supported.
10.17.1	The Local Controller Software shall collect event and detector data at resolutions of 0.1 seconds	Mandatory		✔			Supported.

Category ID	Requirement/Description	Mandatory	Desired	Currently Available	Available with Config-uration	Cannot be Provided as Part of the Project	Comments
10	**GENERAL DETECTION (cont.) - The Local Controller Software shall provide**						
10.17.2	The Local Controller Software shall adhere to the Purdue controller enumerations schema (http://docs.lib.purdue.edu/jtrpdata) (Indiana Traffic Signal Hi Resolution Data Logger Enumerations)	Mandatory		✔			The D4 supports the collection of high resolution data per the Indiana Traffic Signal Hi Resolution Data Logger standard.
10.18	The Local Controller Software shall provide Automatic Detector Diagnostics for the following conditions		Desired	✔			Erratic counts (pulses/minute), is also supported along with fail mode and fail time options.
10.18.1	Max Presence		Desired	✔			D4 supports Max Presence (in minutes) configurable on a per detector basis.
10.18.2	No Activity		Desired	✔			D4 supports No Activity (in minutes) configurable on a per detector basis.
10.18.3	Erratic Output		Desired	✔			D4 supports Erratic Counts (in pulses/minute) configurable on a per detector basis.
10.18.4	Failed Communications		Desired	✔			D4 supports placing a call when communications to the detector card is lost.
10.19	The Local Controller Software shall be able to place a vehicle or pedestrian call from the front panel on any phase or overlap that can be toggled off or will automatically be removed after an user selectable timeout period.		Desired		✔		D4 supports the entry of vehicles calls, pedestrian calls, transit calls, and preempt calls from the front panel. We currently do not have a timeout feature but can implement for this project. We propose working with the City so we better understand the application and provide the desired functionality.
11	**QUEUE DETECTION - The Local Controller Software shall provide**						
11.1	Minimum of sixteen queue detectors.	Mandatory		✔			D4 has 16 queue detectors that can alter the pattern mode, initiate a preempt, alter phase max times or adjust transit priority operation.
11.2	Capability to detect traffic backups.	Mandatory		✔			Via the delay on and delay off parameters (in seconds) adjustable per queue detector.
11.3	Capable of selecting alternate coordination patterns, maximum green timings or specified preempts.	Mandatory		✔			See Category 11.1 above.
11.4	Capability to provide advance green to clear vehicle movements prior to transit vehicle arrival	Mandatory		✔			The D4 allows the queue detector to work in conjunction with a specified transit phase to provide queue clearance for an approaching transit vehicle.
12	**PEDESTRIAN/BICYCLE DETECTION - The Local Controller Software shall provide**						
12.1	Minimum of sixteen pedestrian/bicycle detectors.	Mandatory		✔			The D4 has 16 pedestrian detectors. The D4 has 64 vehicle detectors, any of which can be programmed for bicycle detection.
12.2	Programmable calls for pedestrian/bicycle phases.	Mandatory		✔			Each of the 16 pedestrian detectors and 64 vehicle detectors (programmable) as bicycle detectors can be programmed to call any of the 16 available phases.
12.3	Sequential pedestrian/bicycle call, allowing for sequential calling of two pedestrian/bicycle phases.	Mandatory		✔			Pedestrian and bicycle phases may follow each other or time concurrently depending on the specific intersection configuration.
12	**PEDESTRIAN/BICYCLE DETECTION (cont.) - The Local Controller Software shall provide**						
12.4	Each pedestrian/bicycle detector inputs shall be assignable to any one or more phases, via program entry		Desired	✔			Each pedestrian and bicycle input can be assigned to any of one or more phases.
12.5	Delay and extend pedestrian/bicycle timing.		Desired	✔			Delay and extend timing is available for exclusive bicycle phases and detectors. Early walk and delay walk is available for pedestrian phases globally and per plan.
12.6	Be able to place a vehicle or pedestrian call from the front panel on any phase or overlap that can be toggled off or will automatically be removed after an user selectable timeout period.	Mandatory			✔		See Item 10.19 above.

Category ID	Requirement/Description	Mandatory	Desired	Currently Available	Available with Config-uration	Cannot be Provided as Part of the Project	Comments
13	**TRANSIT DETECTION - The Local Controller Software shall provide**						
13.1	Minimum of eight transit detectors.	Mandatory		✔			D4 has 8 transit detectors that can be presence, check-in / check-out or pulsing inputs for low priority service.
13.2	Programmable calls for transit phases.	Mandatory		✔			Each transit detector can call one or more transit phases.
13.3	Delay and extend timings per each transit phase.	Mandatory		✔			Both delay and extend timings are present with an additional delay only for check-out detectors.
13.4	Travel time delay.	Mandatory		✔			Via the travel time and travel time slack parameters on the detector.
13.5	Alternate travel times programmable by TOD.	Mandatory		✔			Up to 3 different travel times are available per detector which is activated via the priority plans.
13.6	Adaptive arrival time adjustment.	Mandatory		✔			Unique adaptive step and max settings are available for the base priority in addition to each of 3 alternate travel times that are selectable via the priority plans.
14	**REMOTE TRANSIT DETECTION - The Local Controller Software shall provide**						
14.1	Minimum of thirty-two remote transit detectors.	Mandatory		✔			Each of the 8 transit phases can be called by up to 4 remote transit detectors. The 32 remote transit detectors have the same capabilities as the local detectors, including the 3 alternate travel times and adaptive capabilities.
14.2	Calls received from other intersections via Peer-to-Peer network.	Mandatory		✔			Each intersection can accept calls from up to 8 intersections within the signalized network.
14.3	Travel time delay.	Mandatory		✔			Via the remote travel time and remote travel time slack parameters on the detector.
14.4	Alternate travel times programmable by TOD.	Mandatory		✔			See 14.1
14.5	Adaptive arrival time adjustment.	Mandatory		✔			See 14.1
15	**COORDINATION FEATURES - The Local Controller Software shall provide**						
15.1	The Local Controller Software shall be capable of providing coordinated operation	Mandatory		✔			Supported.
15.2	Minimum of one-hundred twenty-eight coordination patterns.	Mandatory		✔			D4 has 128 coordination plans each with an alternate timing table that allows the user to adjust individual base timing parameters on a per plan basis.
15.3	Cycle time and three offsets per plan and ring group.	Mandatory		✔			D4 supports up to 3 offsets for each ring group per plan. Offset 1 is used by default unless the user selects Offset 2 or 3 in the TOD schedule.
15.4	Flexible global split adjustment for transition.	Mandatory		✔			The global transition short and transition long percentages apply for all plans if set.
15.5	Flexible per phase split adjustment for transition.	Mandatory		✔			The Min split and/or Max split settings in the plan will override the respective global setting if the corresponding parameter is programmed.
15.6	Fixed/floating force-offs with per phase floating green parameter.	Mandatory		✔			Floating force-offs are enabled per phase. When enabled the phase would only receive the split time that was allocated. The float green parameter (if non-zero) will control how much slack time it can receive from prior phases, if available from gap-outs, etc.
15.7	Automatic permissive calculations, in single/multi band modes, with permissive limit timer.	Mandatory		✔			Permissives can be calculated automatically for vehicular and pedestrian movements and remain open as long as possible unless the permissive limit timer is set to a non-zero value.
15.8	Ability to enter up to two permissive windows (opening and force off) per phase in lieu of automatically calculating from split		Desired	✔			Two permissive windows are supported and are user configurable.
15.9	Three pedestrian permissive modes per pattern.	Mandatory		✔			D4 supports Yield, Partial and Omit for pedestrian permissive modes.

Category ID	*Requirement/Description*	*Mandatory*	*Desired*	*Currently Available*	*Available with Config-uration*	*Cannot be Provided as Part of the Project*	*Comments*
15	**COORDINATION FEATURES (cont.) - The Local Controller Software shall provide**						
15.10	Selectable re-service phases (fully-actuated coordination).	Mandatory		✔			When the reservice permissive mode is selected it will open the opportunity up for all phases unless individual reservice phases are selected.
15.11	Double service of phases without use of overlaps.	Mandatory		✔			This is enabled via plan by selecting the desired double service phase and putting a time in the Split 2 parameter. This can be made to be guaranteed or conditional by selecting the reservice or permissive reservice flag for the double service phase.
15.12	Actuated coordinated phases can gap-out early and redistribute unused time to movements with greater demand.	Mandatory		✔			This is accomplished via the split extension parameter which controls how early the coordinated phase(s) can gap-out. If the No Extend option is selected for the coordinated phase then only the phase(s) in other rings can prevent gap-out during this period (typically the lagging left-turn)
15.13	Programmable recalls, omits, and alternate base timing for each pattern.	Mandatory		✔			Includes min recall, max recall, vehicle omit, pedestrian omit, overlap omit and FYA omit.
15.14	Adaptive splits per timing pattern with global step and threshold values.	Mandatory		✔			Enabled per plan and controlled by the global adaptive threshold and adaptive step settings. The min and max splits in the plans control the range that each of the phases can adjust.
15.15	Multiple interconnect modes to include at a minimum of TOD, central control via hardwire or twisted pair, IP based communication.	Mandatory		✔			All of the listed modes are supported by D4.
15.16	In the absence of central control, a local controller can be operate in a “Master” mode utilizing twisted-pair, IP or hard- wire inner-connect connectivity.	Mandatory		✔			On a network any D4 can be a Master by sending plan and time commands to other controllers that have the same subnet and are enabled to receive these commands. D4 also supports twisted-pair or hardwire to send plans to other controllers.
15.17	Multiple transition modes shall be provided for programmed pattern changes. Controller shall have capability to cycle in a dwell state or short, long or combination thereof. Advanced transition mode that will ignore minimum pedestrian phase timings shall also be provided.		Desired	✔			D4 supports 5 transition modes that can be set globally or changed by pattern. All modes are supported including a mode that will ignore minimum ped timings if the ped is not on recall.
15.18	The offset be referenced (or be capable of being referenced) to the end of the green of the coordinated phase(s).		Desired	✔			D4 supports 5 offset reference modes including Lagging Force-Off which is the force-off (end of green) for the lagging coordinated phase.
15.19	Minimum pedestrian service time can exceed the split time for a phase.	Mandatory		✔			D4 allows pedestrian phases that do not fit in the split time. D4 also allows the user to configure how the controller will respond to a pedestrian phase that violates the phase force-off point to avoid transition. The D4 can adjust split times prior to (in anticipation of) a ped time that does not fit in the split as well as adjust splits for phases following the pedestrian phase to avoid transition. Each phase can be individually controlled as to how much time can be subtracted from its split to prevent longer pedestrian phases from created unacceptably short left-turn phases etc.
15.20	The Local Controller Software shall support a local Adaptive mode that adjusts splits based on Phase gap outs and max outs.		Desired	✔			The D4 fully supports adaptive splits and allows the user to enable/disable adaptive splits by pattern and controls the range of allowed splits for each phase per pattern.
16.1	Minimum of ten prioritized preempts.	Mandatory		✔			D4 has 10 preempts. The service priority controls the priority of the preempt. By default preempts are first-come first-serve.

Category ID	Requirement/Description	Mandatory	Desired	Currently Available	Available with Config-uration	Cannot be Provided as Part of the Project	Comments
15	**COORDINATION FEATURES (cont.) - The Local Controller Software shall provide**						
16.2	Each Pre-emption input shall be programmable to have equal or higher priority.	Mandatory		✔			Each of the 10 preempts can be assigned a service priority number so the user has complete control over which preempt has the highest priority. Preempts with a higher service priority will be able to override preempts with a lower service priority.
16.2.1	Equal priority preempts shall be served on a first called, first served basis	Mandatory		✔			In the D4, a preempt with the same priority as the active preempt will not be able to override the active preempt.
16.2.2	Higher priority preempts shall override a lower priority preempt	Mandatory		✔			In the D4, preempts with a higher service priority will be able to override preempts with a lower service priority.
16.3	Each preempt must include two track clearance states, dwell state and exit state.	Mandatory		✔			D4 supports two track clearance intervals, dwell states (including dwell, initial dwell and dwell ped options). Preempts also support the normal exit mode in addition to 5 other modes.
16.4	Permit or allow the use of any phase/overlap for each preempt state.	Mandatory		✔			Supported, including controlling the state of the flashing yellow arrow for each interval of preempt.
16.5	Per phase preempt timing (vehicle and pedestrian)	Mandatory		✔			Vehicle and pedestrian timing are configurable for each preempt in the D4.
16.6	Presence preempt input with optional fail-safe interlock input, Advanced Preempt Circuit capability.	Mandatory		✔			D4 supports a fail-safe interlock / supervised circuit for each preempt that can be set to equal or opposite. Presently in use along the Hardy Toll Road at Rankin Rd and Richey Rd. in Houston area.
16.7	Utilize gate down input as part of Advanced Preempt Circuit to provide early termination of preempt feature, track clearance.	Mandatory		✔			Gate down input is supported for all preempts along with the associated track clear extend and max parameters. This is also in use at Rankin Rd / Richey Rd. in the Houston area.
16.8	Check-in/Check-out preempt detection option with override timer.	Mandatory		✔			Supported via PmtChkIn and PmtChkOut cabinet mapping in lieu of Preempt mapping.
16	**PREEMPTION FEATURES - The Local Controller Software shall provide**						
16.9	Exit to programmed phase, next phase (phase following the active phase when preempt commenced), same phase (if phase was cut short at the start of preempt), or in-sync.	Mandatory		✔			Each preempt supports 6 exit modes which includes the options mentioned in this section.
16.10	Automatic yellow trap protection for all preemption sequences.	Mandatory		✔			Yellow trap protection is set in the phase options and is obeyed for all instances including preempt. Such settings are not required for flashing yellow arrow where this is automatically built in.
16.11	Four soft preempts provided for step-by-step (special preempt sequence).	Mandatory		✔			D4 has 4 soft preempts with 8 steps each. Each step can be timed or actuated.
16.12	Eight state per soft preempt sequence (timed or actuated).	Mandatory		✔			See 16.11.
16.13	Each of the soft preempt states allows programmable calls, omits, hold and force-offs for each phase and overlap.	Mandatory		✔			Vehicle phases, pedestrian phases and overlaps can be controlled separately for holds, force-offs and omits.
16.14	The Local Controller shall provide user selectable entry and exit phases for each unique preempt input		Desired	✔			Both entry (called Enable Phases in D4) and exit phases are user settable per preempt.
16.15	At the Conclusion of any preempt call, the Local Controller Software shall provide an exit transition timing and signal display to a programmed return-to-normal condition.		Desired	✔			The preempt status display screen will show the state of the preempt including exit. Following the exit phases of the preempt, the controller may require transition which is included on the coordination status display screen.

Category ID	Requirement/Description	Mandatory	Desired	Currently Available	Available with Config-uration	Cannot be Provided as Part of the Project	Comments
16	**PREEMPTION FEATURES (cont.) - The Local Controller Software shall provide**						
16.16	All preempts inputs shall have priority over Automatic Flash.		Desired	✔			This is user configurable per preempt. If Override Flash is programmed to yes, the preempt can terminate Flash operation and serve its normal sequence. If programmed to No, the preempt will remain inactive if the controller is in automatic flash.
16.17	The Local Controller Software shall provide indications to identify the status of preempt operation. These indications shall include the following:		Desired	✔			Supported.
16.17.1	Preempt Call		Desired	✔			The preempt call is displayed in the preempt status display screens.
16.17.2	Preempt in Control		Desired	✔			When preempt is controlled this will be indicated on many of the status display screens including the phase status display screens, coordination status display screens, preempt status display screens and transit status display screens.
16.17.3	Preempt Interval		Desired	✔			Preempt Interval counters are shown in the Preempt status display screens.
16.17.4	Preempt Interval Counter		Desired	✔			The preempt intervals are displayed in the preempt status display screens.
16.18	During preemption operation, the overlaps should respect their parent phase programming unless specifically programmed to terminate during preemption.		Desired	✔			By default the D4 does not respect parent phasing during pre-emption. We have already modified the firmware so that parent phasing is respected during pre-emption and this configuration will be provided for this project.
17	**TRANSIT PRIORITY FEATURES - The Local Controller Software shall provide**						
17.1	Programmable transit priority options for each transit phase.	Mandatory		✔			Multiple transit priority options are supported for each transit phase.
17.2	Operates based on arrival times using local intersection detection and remote "peer-to-peer" combined with estimated delay from upstream intersections.	Mandatory		✔			Supported based on travel times received from local and/or remote peer-to-peer transit detectors.
17.3	Separate options for free or coordinated operation.	Mandatory		✔			There are 5 coordinated priority modes and 2 free priority modes among other options.
17.3.1	Extend only (no phase abbreviation) or Early/Extend operation.	Mandatory		✔			Supported for both coordinated and free operation. Can be different for each mode. Several other priority modes are also supported in the D4.
17.3.2	Minimum phase green timing.	Mandatory		✔			Each phase has a priority minimum green setting (typically larger than the normal minimum green) that prevents phases from being cut unnecessarily short during priority. Phases can still gap-out naturally.
17.3.3	Maximum extend limit.	Mandatory		✔			Maximum extension is supported for both free and coordinated operation and can vary for each of the 8 transit phases.
17.3.4	Optional vehicle/pedestrian phase omits.	Mandatory		✔			Vehicle / ped omits are supported for both free and coordinated operation and can vary for each of the 8 transit phases.
17.3.5	Alternate sequence switching.	Mandatory		✔			This option is available for each transit phase and allows the sequence to change that cycle as a last resort in order to minimize delay to the transit vehicle.
17.4	Adaptive arrival times to automatically compensate for varying station dwell times.	Mandatory		✔			Supported via the adaptive priority module that supports both local detectors and remote detectors. Unique adaptive step and max settings are available for the base priority in addition to each of 3 alternate travel times that are selectable via the priority plans.

Category ID	Requirement/Description	Mandatory	Desired	Currently Available	Available with Config-uration	Cannot be Provided as Part of the Project	Comments
18	**EMERGENCY VEHICLE PRIORITY - The Local Controller Software shall provide**						
18.1	Local Controller Software must support EVP field equipment (installed and maintained by various others).		Desired	✔			D4 presently supports E-Views equipment at approximately 180 intersections in the Houston area. All connections are through the communications network. If no network exists then a crossover cable is used to share information between devices. Similar development can take place for whatever system(s) are ultimately chosen by the City of Austin and/or City of San Antonio.
18.2	EVP field equipment is GPS based, no direct inputs to controller preemption		Desired	✔			See 18.1
18.3	All messaging must be passed directly to the controller via Ethernet (using a crossover cable if no Ethernet switch is present) and pass the Vehicle ID directly to the controller. No direct connection to preempt inputs is allowed.		Desired	✔			Travel time away, direction, left-turn request and Vehicle ID are all passed to the D4 controller via Ethernet in the current supported GPS based system.
18.4	Raw inputs shall not be used in the detector racks.		Desired	✔			No raw inputs are used, although D4 does have this capability.
18.5	EVP Travel Time shall be reported and available on status screen away from the intersection (in seconds), minimum of eighty seconds advance notice required.		Desired	✔			This information is viewed on status screen M-0-4-
18.6	EVP Vehicle ID shall visible from the controller front panel and in the controller logs		Desired	✔			Viewed on M-0-4- or M-0-B
18.7	Local Controller Software shall have the following available EVP inputs:		Desired	✔			Supported for all cabinet types.
18.7.1	A minimum of Minimum of four messages per direction, sixteen total.		Desired	✔			All messages report travel time information, left-turn request, and check-out directly from the GPS unit to the D4 via Ethernet. This section appears to be related to inputs as stated in 12.1.20.7.
18.7.2	Two - Advance messages (four preferred).		Desired	✔			Four advanced inputs available. They come in through the cabinet input section (APCin, APCin2, APCin3 and APCin4).
18.7.3	One – Left turn message (latched).		Desired	✔			Left-turn input comes in through the cabinet inputs (APSCin).
18.7.4	One - Check-out message (active when vehicle is at the stop-bar).		Desired	✔			Check-out input comes in through the cabinet inputs (APCout).
18.7.5	Each of the advance messages shall not activate until the specified travel time away from the intersection is reached.		Desired	✔			Controlled on GPS side to match what is in the controller.
18.8	Local Controller Software shall provide input as default, “No Left Turn”.		Desired	✔			No left-turn request is the default unless requested by the EVP.
18.8.1	Any required left turn request (per approach) must be logged.		Desired	✔			Left-turn requests logged along with the general priority request. Left-turn requests are also shown on the main status display.
18.8.2	Left turn inputs shall be able to be “latched” call.		Desired	✔			D4 latches emergency vehicle left-turn requests unless the check-out occurs before the service of the left-turn signal.
18.8.3	Left turn signal shall only need to be on for minimum one second to latch.		Desired	✔			EVP left-turn requests are latched the moment they are received.
18.9	The natural controller sequence shall be preserved at all times. By default no phases are skipped and left-turn signals operate as normal unless requested by the emergency vehicle.		Desired	✔			No phases are skipped by default although the user has the ability to select phases that can be skipped to service the EVP in time.
18.10	No phase with demand shall be shortened to less than the alternate minimum green and the priority shall proportionally truncate all conflicting phases subject to this constraint.		Desired	✔			D4 proportionally truncates conflicting phases by default. The permissive minimum green (if greater than the minimum green) will not be truncated while there is demand for that movement.
18.11	In the instance where phase truncation is necessary (with full vehicular demand on the conflicting movements), the controller shall not arrive on the service phase earlier than the specified travel time for that approach.		Desired	✔			D4 is set to have the green active the time the vehicle is the programmed travel time away (typically 20 seconds).

Category ID	Requirement/Description	Mandatory	Desired	Currently Available	Available with Config-uration	Cannot be Provided as Part of the Project	Comments
18	**EMERGENCY VEHICLE PRIORITY (cont.) - The Local Controller Software shall provide**						
18.12	Local Controller Software shall have at least four emergency vehicle priority modules (one per approach).	Mandatory		✔			D4 has 8 EV priority modules and typically use priority modules 2, 4, 6 and 8 to correspond with phases 2, 4, 6 and 8.
18.12.1	Provides two-way communication between emergency / transit vehicles and the traffic signal to provide intelligent priority requests	Mandatory		✔			All connections are through the communications network facilitating two-way communications.
18.12.2	Interface to GPS equipment that provides travel time away, Vehicle ID and left-turn requests with the goal of maintaining arterial two-way progression	Mandatory		✔			Travel time away, direction, left-turn request and Vehicle ID are all passed to the D4 controller.
18.13	Each module should consist of the following programming items:		Desired	✔			Supported.
18.13.1	Primary service phase (thru phase) – activated by GPS advance message(s).		Desired	✔			Supported.
18.13.2	Secondary service phase (left turn phase) – activated by GPS left-turn message.		Desired	✔			Supported.
18.13.3	Flags with the ability to omit phases or pedestrian movements as necessary for each of the priority modules (no omits by default).		Desired	✔			Supported.
18.13.4	Travel time parameter for the primary service phase (thru-phase) where the specified movement shall be green by the time the vehicle is that distance away.		Desired	✔			D4 attempts to provide a green signal by the time the vehicle is the specified travel time away.
18.13.5	Any conflicting walk rest shall be terminated once a conflicting emergency vehicle request is recognized by the controller.		Desired	✔			Supported. Non-conflicting pedestrian movements will continue to rest as normal.
18.13.6	On a coordinated street the opposing direction walk rest shall be terminated only if a conflicting secondary service phase is programmed.		Desired	✔			Supported.
18.13.7	Any walk rest parallel to the emergency vehicle shall rest as normal.		Desired	✔			Supported.
18.13.8	Travel time parameter for the secondary service phase (left-turn-phase) where the specified movement shall be green by the time the vehicle is that distance away.		Desired	✔			Supported. This is also typically set at 20 seconds.
18.13.9	Check out input – activated by GPS check-out message.		Desired	✔			Supported.
18.13.10	Maximum presence timer where the priority is ignored until the call is dropped.		Desired	✔			Supported for each of the 8 EV priority modules.
18.14	A conflicting emergency vehicle priority request on the cross street shall be able to force-off the coordinated phases early in order to serve the green by the specified travel time.		Desired	✔			Supported.
18.15	Local Controller Software shall have mechanism in place to prevent acceptance of increasing travel times from the GPS unit if the emergency vehicle were to encounter reduced speeds.		Desired	✔			D4 automatically ignores increasing travel times to prevent premature phase termination.
18.16	All phases shall have an alternate priority minimum green (typically greater than the normal minimum green) that will apply if there is demand for a particular phase.		Desired	✔			Emergency vehicle priority will not shorten a phase to less than the permissive minimum green if that movement is extending however that phase can still gap normally.
18.17	Upon check-out the Local Controller Software shall immediately move onto the next phase if the priority is timing beyond the normal force-off point, subject to the alternate minimum green.		Desired	✔			Supported.
18.18	Local Controller Software shall log all priority requests and left-turn requests, including Vehicle IDs.		Desired	✔			See 18.8.1.

Category ID	Requirement/Description	Mandatory	Desired	Currently Available	Available with Config-uration	Cannot be Provided as Part of the Project	Comments
19	**STATUS/DIAGNOSTIC FEATURES - The Local Controller Software shall provide**						
19.1	A multitude of detailed controller status displays shall be available through the front panel display of the 2070 Controller.	Mandatory		✔			Status menu is option 0 from the main menu (M-0).
19.2	At a minimum, the following status screens shall be user selectable:	Mandatory		✔			Supported.
19.2.1	Phase, ring and overlap status.	Mandatory		✔			Phase / ring is M- 0-1 and overlap status is M-0-2
19.2.2	Transit phase/priority status.	Mandatory		✔			M-0-6 – multiple screens
19.2.3	Coordination status.	Mandatory		✔			M-0-3 – multiple screens
19.2.4	Preemption status.	Mandatory		✔			M-0-4 – multiple screens
19.2.5	Vehicle and Pedestrian detector status.	Mandatory		✔			M-0-5 – multiple screens. D4 shows raw calls as well as locked calls for both vehicle and pedestrians. D4 shows delays (d), extensions (e) or detector disconnect via (-)
19.2.6	Transit priority status.	Mandatory		✔			M-0-6 – multiple screens
19.2.7	Cabinet/Field/ I/O Status.	Mandatory		✔			M-0-7 – multiple screens
19.2.8	System communication status.	Mandatory		✔			M-0-8 – multiple screens
19.2.9	Current active software version and intersection street names.	Mandatory		✔			Shown on the main menu. Alternates between the version and name of the intersection.
19.3	A minimum of six-thousand controller event log shall be provided.	Mandatory		✔			M-0-B – multiple screens
19.3.1	Multiple classes of events can be individually enabled for logging.	Mandatory		✔			This is controller from menu B from the main menu.
19.3.2	Logs can be retrieved and/or reset from ATMS connection (serial or IP), or from front panel.	Mandatory		✔			Can be brought back from the D4 logger or from central systems that support this capability.
19.4	A minimum sixty days logging of volume/occupancy for sixteen detectors at fifteen minute intervals.	Mandatory		✔			Supported.
19.5	A minimum six-hundred CMU/MMU time-stamped event log shall be accessible, that will include reason for failure and status of all the field outputs at time of fault.	Mandatory		✔			Viewable in M-0-7+
19.6	All changes to the database should be time-stamped		Desired	✔			The last upload/download is currently logged.
19.7	The Local Controller Software shall provide controller logs containing the following minimum information		Desired	✔			The controller allows the user to select which category of events are logged.
19.7.1	Critical Response Frame Errors		Desired	✔			Supported.
19.7.2	Non-critical Response Frame Errors		Desired	✔			Supported.
19.7.3	Detector Errors		Desired	✔			Detector faults including communication faults, detector channel failures, max presence (veh and ped), no activity (veh and ped), erratic counts, (ped) and transit detector faults are all logged.
19.7.4	Local Flash Faults		Desired	✔			MMU faults including CVM, 24 Volt, Conflict, Red Fail, MMU Diagnostic, Minimum Clearance, Port 1 Fault, Fault Relay Transfer and MMU Reset are all logged.
19.7.5	Preempt		Desired	✔			Start and end of a normal preempt, start and end of a preempt max-out condition, preempt reaching check-out limit and preempt input interlock failure are all logged. Soft preemption events are also logged.
19.7.6	Power On/Off		Desired	✔			Each time the controller power is turned on and turned off is currently logged.
19.7.7	Coordination transition		Desired	✔			Coordination change of pattern (including free and flash) and the start end of transition is currently logged.
19.7.8	Coordination errors		Desired	✔			Supported.
19.7.9	Priority status		Desired	✔			Supported.

Category ID	Requirement/Description	Mandatory	Desired	Currently Available	Available with Config-uration	Cannot be Provided as Part of the Project	Comments
20	**CONTROLLER LOGIC REQUIREMENTS - The Local Controller Software shall provide**						
20.1	At a minimum the following logic descriptions and functions must be provided as primary I/O logic requirements (OR, AND, NOT, NOR & NAND).	Mandatory		✔			D4 supports these requirements in addition to 3 additional functions which include Or(Not2), And(Not2) and Latch. Latch allows the first function to turn the channel true and the second function return to false.
20.2	All available "timed" parameters and status indicators for phases and overlaps should be able to used in the definition of logic statements.		Desired	✔			All of the phase and overlap timed parameters are available in the logic channels including support for triggering events after specific durations of these "timed" parameters.
20.3	Logic statements shall be evaluated prior to the controller taking action directly based on an input.		Desired	✔			Supported.
20.4	64 cabinet logic channels to accomplish custom controller I/O operation.	Mandatory		✔			The D4 supports 64 I/O logic channels.
21	**PEER to PEER LOGIC**						
21.1	Local Controller Software must allow selected input and output functions from remote intersections to trigger an output function at the local intersection. Remote inputs and outputs will be received over the Ethernet port (ETH0) of the controller. Each peer channel shall perform Boolean logic on up to two remote input/output functions with an optional delay to trigger the peer logic channel and therefore assert the selected local output function. Local Controller Software will provide a minimum of 16 peer logic channels.	Mandatory		✔			16 peer logic channels supported with functionality as described.
22	**OUTPUTS/INPUTS**						
22.1	All controller input and output functions can be mapped to any physical cabinet input and output for each of the supported cabinet types	Mandatory		✔			All controller inputs and outputs are completely customizable in all cabinet types.
22.2	The Local Controller Software shall provide, via program entry, the following outputs:	Mandatory		✔			Controller outputs are customizable in all cabinet types.
22.2.1	Load Switch Drivers for Vehicle Phase – This output shall provide a Green, Yellow, and Red output for each vehicle phase.	Mandatory		✔			Supported.
22.2.2	Load Switch Drivers for Pedestrian Phase – This output shall provide a Walk, Pedestrian Clearance, and Don't Walk output for each pedestrian movement.	Mandatory		✔			Supported.
22.2.3	Check – This output shall indicate phase or vehicle phase call status		Desired	✔			Supported.
22.2.4	Phase On – This output indicates phase status		Desired	✔			Supported.
22.2.5	Phase Next – This output indicates the next committed phase.		Desired	✔			Supported.
22.3	The Local Controller Software shall provide the following inputs on a per ring basis:		Desired	✔			Controller inputs are customizable in all cabinet types. Additional inputs beyond those listed below are also available.
22.3.1	Force Off in actuated mode terminates the Green timing of the active phase		Desired	✔			Supported.
22.3.2	Force Off in nonactuated mode terminates the Walk Hold of the active phase		Desired	✔			Supported.
22.3.3	Red Rest requires rest in Red of all phases in the timing ring		Desired	✔			Red rest can be programmed on a per phase basis in basic timing options.
22.3.3.1	Registration of a serviceable conflicting call shall result in immediate advance for Red Rest to Green on the demanding phase		Desired	✔			Supported.
22.3.4	Inhibit Maximum Termination – disables the maximum termination functions of all phases in the selected timing ring.		Desired	✔			Supported.

Category ID	Requirement/Description	Mandatory	Desired	Currently Available	Available with Config-uration	Cannot be Provided as Part of the Project	Comments
22	**OUTPUTS/INPUTS (cont.)**						
22.3.4.1	Inhibit Maximum Termination does not inhibit timing of maximum green		Desired	✔			The status display screen shows MAX INH instead of the max countdown timer but the countdown timer continues to run behind the scenes.
22.3.5	Omit Red Clearance – Omits the Red Clearance interval timings		Desired	✔			Supported.
22.3.6	Pedestrian Recycle – This input controls the recycling of pedestrian movements based on the operating mode		Desired	✔			Supported.
22.3.6.1	In actuated mode, the pedestrian movement shall be recycled if the pedestrian recycle input is active on the phase, a serviceable pedestrian call exists, and the hold input is active.		Desired	✔			D4 supports this but there must also be both enough maximum green time (if applicable) and time until the phase will be forced off to serve the full Walk, Pedestrian Clearance, and Solid Don't Walk times.
22.3.6.2	In non-actuated mode, the pedestrian movement is recycled if the pedestrian recycle input is active on the phase, the Pedestrian Omit is not active, and a serviceable conflicting call does not exist.		Desired	✔			D4 supports this but there must also be both enough maximum green time (if applicable) and time until the phase will be forced off to serve the full Walk, Pedestrian Clearance, and Solid Don't Walk times.
22.3.7	Maximum II Selection – Allows the selection of the maximum II time on all phases in the selected ring		Desired	✔			Supported.
22.3.8	Maximum III Selection – Allows the selection of the maximum III time on all phases in the selected ring		Desired	✔			Supported.
22.4	The Local Controller Software shall provide the following outputs on a per ring basis:		Desired	✔			Controller outputs are customizable in all cabinet types. Additional outputs beyond those listed below are also available.
22.4.1	The active phase is in its Green interval and operating in Actuated Mode		Desired	✔			Supported.
22.4.1.1	Minimum Timing – When timing in the Initial, Walk, or Pedestrian Clearance portions of the Green interval		Desired	✔			Supported.
22.4.1.2	Extension Timing – When timing that portion of the Green interval following the completion of the minimum timings		Desired	✔			Supported.
22.4.1.3	Maximum timing – When timing that portion of the Green interval following the completion of the minimum timings, when not timing an extension and the maximum Green is timing		Desired	✔			Supported.
22.4.1.4	Green Rest – When timing that portion of the Green interval when the minimum timings are complete, Passage Timer is timed out and the Maximum Green timer is either timed out or has not started		Desired	✔			Supported.
22.4.2	The active phase is in its Green interval and operating in nonactuated Mode		Desired	✔			Supported.
22.4.2.1	Walk Timing – When timing in the Walk portion of the Green interval		Desired	✔			Supported.
22.4.2.2	Walk Hold – When the output is active, Walk timing is complete and the Hold input is active		Desired	✔			Supported.
22.4.2.3	Pedestrian Clearance Timing – When timing the Pedestrian Clearance interval or the remaining portion of the Minimum Green		Desired	✔			Supported.
22.4.2.4	Green Rest – When the timing of the Pedestrian and Minimum Green are complete		Desired	✔			Supported.
22.4.3	The Active Phase is not in its Green interval		Desired	✔			Supported.
22.4.3.1	Yellow Change – When timing the Yellow Change		Desired	✔			Supported.
22.4.3.2	Red Clearance – When timing the Red Clearance		Desired	✔			Supported.
22.4.3.3	Red Rest – When timing is complete and a Red indication is displayed		Desired	✔			Supported.
22.5	The Local Controller Software shall have the ability to utilize an alternate Yellow and All Red parameter based on an external input.		Desired		✔		Changes to the yellow are typically not permitted on a cycle-by-cycle basis (see MUTCD 4D.26 paragraph 9). We propose to add the alternate red interval as part of this project.

Category ID	Requirement/Description	Mandatory	Desired	Currently Available	Available with Config-uration	Cannot be Provided as Part of the Project	Comments
22	**OUTPUTS/INPUTS (cont.)**						
22.6	The Local Controller Software shall provide the following inputs, via program input, to each phase:		Desired	✔			Supported.
22.6.1	Hold – The hold input shall retain the Green indication on the selected phase.		Desired	✔			Supported.
22.6.1.1	Hold on a nonactuated phase		Desired	✔			There is a single hold input it can be applied to a non-actuated or actuated phase.
22.6.1.2	Hold on an actuated phase		Desired	✔			There is a single hold input it can be applied to a non-actuated or actuated phase.
22.6.2	Phase Omit - The Phase Omit input shall cause the omission of a phase	Mandatory		✔			Supported.
22.6.3	Pedestrian Omit – The Pedestrian Omit input shall inhibit the selection of a phase due to a pedestrian call on that phase and to prohibit the servicing of a pedestrian call on that phase.	Mandatory		✔			Supported.
22.6.4	Maximum II Selection – Allows the selection of the maximum II time per phase		Desired	✔			Supported.
22.6.5	Maximum III Selection – Allows the selection of the maximum II time per phase		Desired	✔			Supported.
23	**INITIALIZATION**						
23.1	The Local Controller Software shall provide the following features on a Per Unit basis:	Mandatory		✔			Supported.
23.2	Initialization - Initialization shall occur after either of the following conditions:	Mandatory		✔			Supported.
23.2.1	Restoration of power after a defined power interruption	Mandatory		✔			The controller will automatically resume in the startup sequence after power is restored.
23.2.2	Activation of an External Start input	Mandatory		✔			The controller will automatically go to the beginning of the startup sequence when an External Start input is received.
23.3	The Local Controller Software shall provide a program entry for initialization to allow define initialization start-up at the beginning of the Green, Yellow, or Red interval of any phase or nonconflicting phase pair	Mandatory		✔			By default the controller will being the start-up phases in green. Any start-up phase can be modified to startup in yellow or red. Additionally, if the start-up phases include pedestrian timing the user can choose whether to start-up in walk or solid don't walk.
23.4	Upon start up, software shall automatically go into time-of-day/day-of-week mode, and shall operate using the current timing plan called for in the time-of-day schedule. No intervention shall be required to operate according to the schedule. If at any time the clock is updated, whether through the keyboard or by means of the central software or portable computer, and the new time corresponds to a different timing plan, the controller shall begin to operate the new timing plan automatically.	Mandatory		✔			The D4 operates as described in this requirement.
24.1	Alternate Sequence – The Local Controller Software shall provide fifteen alternatives to the standard sequence		Desired	✔			Alternate sequences are defined on a per plan basis by reversing phase pairs. Theoretically 256 different sequences could be defined. Alternatively, the user can define eight custom sequences by entering the phase orders directly.
24.2	The alternate sequences shall provide every combination of lead-lag operation for an eight phase Dual Ring configuration.		Desired	✔			Every possible combination of lead-lag operation is programmable in the D4.
24.3	The Alternate sequence shall be user definable	Mandatory		✔			Eight custom sequences are user programmable.
24.4	The Alternative Sequence shall be selectable by Timing Plan	Mandatory		✔			Any combination of phase pairs can be swapped or any of the eight custom sequences are selectable per plan.

Category ID	Requirement/Description	Mandatory	Desired	Currently Available	Available with Config-uration	Cannot be Provided as Part of the Project	Comments
24	**ALTERNATE SEQUENCE (cont.)**						
24.5	It shall be possible to define any phase as restricted from operating concurrently with any other phase with which it would otherwise be able to operate concurrently without the use of logic programming.	Mandatory		✔			The Conflicting Phases option in the D4 allows any two phase pairs to be defined as conflicting even if they are compatible in the ring and barrier diagram. When defined as a conflicting phase, the controller will not run these two phases together.
24.6	The Local Controller Software shall allow programming of Uneven Double Cycling	Mandatory		✔			Supported.
24.7	The Local Controller Software shall allow programming to serve certain or all phases of an intersection twice within the corridor's background cycle.	Mandatory		✔			The D4 allows a phase to be programmed for reservice and be serviced again in the coordination cycle.
24.7.1	The split time for first and second service shall be separately defined.	Mandatory		✔			The D4 has a Split 2 parameter to indicate the split time for the second service.
24.7.2	Phases can be omitted from either the first or second service.	Mandatory		✔			Supported.
24.8	The Local Controller Software shall allow programming of twice-per-cycle servicing of left turns	Mandatory		✔			The D4 allows a phase to be programmed for reservice and be serviced again in the coordination cycle.
24.8.1	Each left turn service should have a split time that is separately defined.		Desired	✔			The D4 has a Split 2 parameter to indicate the split time for the second service.
24.8.2	Twice-per-cycle servicing of left turns shall be able to be implemented by time-of-day		Desired	✔			Reservice is defined on a per plan basis and therefore can change by time-of-day.
24.8.3	Twice-per-cycle servicing of left turns shall be demand driven using vehicle detectors		Desired	✔			Supported.
25	**SPECIAL FUNCTIONS**						
25.1	The Local Controller Software shall provide a minimum of 16 special functions	Mandatory		✔			The D4 supports 16 special functions.
25.2	Each special function shall be controllable from the central control	Mandatory		✔			This functionality is supported between KITS and D4.
25.3	Each special function shall be controllable from the local time-of-day schedule	Mandatory		✔			Supported.
25.4	Each special function shall be controllable for the special function inputs	Mandatory		✔			Supported.
25.5	Each special function shall be programmable per plan and pattern	Mandatory		✔			Supported.
26	**SAFEGUARDS**						
26.1	Local Controller Software shall include safeguards to preclude dangerous or undesirable intersection operation.		Desired	✔			The D4 has built in mechanisms to ensure that conflicting phases do not run together and that yellow trap does not occur. Additionally, the D4 will check the MMU program card vs. what the D4 thinks it should be and give the user a warning if there are differences so that they can be double checked and programmed to be ignored if appropriate under the MMU compatibility menu.
26.2	These safeguards shall, as a minimum, include range checking, and coordinated timing plan diagnostics for each pattern/split combination.		Desired	✔			Supported.
26.3	At a minimum, timing plan diagnostics shall check for the following:		Desired	✔			Supported.
26.3.1	Split times which violate minimum phase lengths (minimum green + yellow + all red)		Desired	✔			The D4 editor will highlight splits that violate these minimums in yellow.
26.3.2	Split times which violate pedestrian times (walk + flashing don't walk + yellow + all red)		Desired	✔			The D4 editor will highlight splits that violate these minimums in yellow.
26.3.3	Split times which do not add up to cycle length		Desired	✔			The D4 provides a warning when exiting the menu if the split times do not add up to the cycle length.
26.3.4	Split times which cause barriers to not be aligned.		Desired	✔			The D4 provides a warning when exiting the menu if split times do not add up between barriers.

Category ID	Requirement/Description	Mandatory	Desired	Currently Available	Available with Config-uration	Cannot be Provided as Part of the Project	Comments
26	**SAFEGUARDS (cont.)**						
26.4	The diagnostics shall check for split time violations which occur during short way correction mode as well as those which occur during the programmed cycle length for a given coordination pattern.		Desired	✔			The D4 will never reduce a phase split shorter than the sum of the phase Minimum Green plus Yellow Clearance plus Red Clearance so this check is not needed.
26.5	Checking for splits which violate pedestrian times shall not prevent the use of vehicular splits which are less than the pedestrian times		Desired	✔			Since the D4 can accommodate these situations, the controller allows pedestrian times to be entered that are longer than the programmed split times.
26.6	When errors occur, the results shall be displayed clearly and concisely with information sufficient for timely correction by the operator		Desired	✔			Errors in split times are reported immediately. Regardless, the controller will always serve every phase. If coordination parameters are lacking or configured in a conflicting way the controller will run free in which case all phases will be served.
26.7	If there are no errors, the controller shall service all serviceable phases and pedestrian movements with calls during every cycle. This shall occur regardless of whether or not the controller is in transition from one offset to another. The controller shall service every serviceable phase even while in transition from one phase sequence to another, and while leaving pre-emption.		Desired	✔			The controller will service all serviceable phases in either coordination mode or in free mode if it cannot run coordination based on the coordination parameters.
27	**OPERATIONS**						
27.1	The Local Controller Software shall be capable of providing internal Time Base Control, via program entry	Mandatory		✔			All coordination patterns and other controller functions are programmable by time-of-day.
27.2	The Local Controller Software shall be capable of being set to manually operate in a selected timing plan, via program entry	Mandatory		✔			The D4 controller can manually be placed into any plan without modifying the schedule. Additionally, the controller could be placed into free or flash via this method.
27.3	The Local Controller Software shall be capable of operating in Free Mode	Mandatory		✔			Free operation is supported by the D4.
27.4	The Local Controller Software shall allow Start-up Flash Operation	Mandatory		✔			The D4 allows the user to set the start-up flash period.
27.4.1	The duration of start-up flash shall be programmable for 0-255 seconds in one second increments	Mandatory		✔			The start-up flash period is settable from 0 to 255 seconds.
27.5	The Local Controller Software shall provide Automatic Flash Operation	Mandatory		✔			Automatic flash is supported by the D4.
27.5.1	The Entry phases to Automatic Flash shall be selectable, via program entry		Desired	✔			Flash entry phases are user definable. If left blank, the controller will enter automatic flash immediately following the phases that are currently timing. To get to the automatic flash entry phases, the D4 will automatically place calls on those phases until they are reached.
27.5.2	The Exit phases from Automatic Flash shall be selectable, via program entry	Mandatory		✔			Flash exit phases are user definable in the D4. Additionally, the user can choose to enter these phases in the yellow or red portion instead of the default green portion.
27.5.3	When exiting Automatic Flash, calls shall be placed on all vehicle and pedestrian movements		Desired	✔			D4 operates as described.
27.6	Users shall be capable of setting date and time settings in the Local Controller Software.	Mandatory		✔			The date and time can be set via the front panel by a user.
27.6.1	The Local Controller Software shall be capable of automatically adjusting for Daylight Savings Time using programmed month/week.	Mandatory		✔			If daylight savings time is enabled, the D4 will automatically adjust for it. The user does not need to program in the week or month, this is obtained automatically.
27.7	The Local Controller Software shall allow selection of timing plans on a time-of-day/day-of-week basis	Mandatory		✔			The controller allows patterns to start at specified times and can be limited to specified days of week.

Category ID	Requirement/Description	Mandatory	Desired	Currently Available	Available with Config-uration	Cannot be Provided as Part of the Project	Comments
27	**OPERATIONS (cont.)**						
27.7.1	The Local Controller Software shall allow up to 40 weekly time-of-day schedules	Mandatory			✔		Many controllers support only Day Plans as that is defined by NTCIP while week time-of-day plans are not. The D4 scheduler has a feature called TOD Patterns where schedules can be programmed in the concept of a Day Plan or week time-of-day plan. The scheduler supports up to 128 distinct events which supports most applications. As part of this project we will modify the scheduler to provide 40 weekly time-of-day plans.
27.8	The Local Controller Software shall be capable of scheduling fixed holidays	Mandatory		✔			Supported.
27.9	The Local Controller Software shall be capable of scheduling floating holidays	Mandatory		✔			Supported.
27.9.1	Floating holidays shall be able to be defined by the occurrence of the specific day within the month (for example 4th Friday in November not Friday during the 4th week in November).	Mandatory		✔			The D4 computes floating holidays in the method requested.
27.10	The Local Controller Software shall be capable of scheduling different seasons of the year. This would enable the calling of different schedules/timing plans during a particular season. (For example a school year.)	Mandatory		✔			Holiday ranges provide an easy, intuitive way to program school schedules, seasonal plans etc.
27.10.1	Seasons should be specified by indicating the start and end dates for each season	Mandatory		✔			Holiday ranges are defined by end / start dates.
27.10.2	If a specific season is not specified for a given day then the day schedule for the default season should be run		Desired	✔			If a day does not fall within a holiday range the default schedule will be run.
28	**SPECIAL DEVICES**						
28.1	The Local Controller Software shall be capable of operating Changeable Lane Assignment Signs (CLAS). This functionality can be direct, or by means of making active specific controller outputs.		Desired	✔			Deployed in Harris County with D4 software.
28.1.1	The operation of the CLAS shall be assignable by Time-of-Day and by plan.		Desired	✔			Supported.
28.1.2	CLAS operation shall include clearance intervals to allow safe change from one assignment to another		Desired	✔			A comprehensive set of CLAS transition sequences has been developed by Advanced Traffic Solutions which can be use dint he D4 depending on the specific lane assignment transition.
28.1.3	CLAS shall have continuous on/off control from the Local Controller Software		Desired	✔			Supported.
28.2	The Local Controller Software shall be capable of operating active “No Right Turn” or “No Left Turn” signs at railroad crossings		Desired	✔			Supported.
28.3	The Local Controller Software shall be capable of collecting data from external sources including Bluetooth and Wi-Fi		Desired		✔		Not currently supported. We would need further information on this requirement to evaluate the feasibility of implementation.
28.4	There will be adequate diagnostics to troubleshoot any possible problems.		Desired	✔			There are several diagnostic screens within the D4 to assist in troubleshooting.
28.5	There will be a log file to review historical events.		Desired	✔			The D4 supports both controller logging (up to 6,000 events) and the Indiana data logger.
28.6	The Local Controller Software shall provide NMEA 0183 support for any compliant GPS device (date and time set)	Mandatory		✔			D4 supports the NMEA 0183 protocol for syncing the controller clock to GPS devices at locations with no communications.
29	**COMMUNICATIONS**						
29.1	The Local Controller Software shall be capable of communicating using TCP/IP Ethernet Standard Protocol	Mandatory		✔			Supported.
29.1.1	The Local Controller shall allow the following Ethernet Settings:	Mandatory		✔			Supported.
29.1.1.1	IP Address	Mandatory		✔			Supported.
29.1.1.2	Subnet Mask	Mandatory		✔			Supported.

Category ID	Requirement/Description	Mandatory	Desired	Currently Available	Available with Config-uration	Cannot be Provided as Part of the Project	Comments
29	**COMMUNICATIONS (cont.)**						
29.1.1.3	Broadcast Address	Mandatory		✔			Supported.
29.1.1.4	DHCP enable	Mandatory			✔		Will be included as part of this project.
29.2	The Local Controller Software shall allow remote ping to verify communication in an IP network.		Desired	✔			Supported.
29.3	High data traffic or network storms should not impact the operation of the Location Controller or cause the intersection to go into flash.	Mandatory		✔			The D4 has been thoroughly tested for this specific concern and no issues have been identified.
29.3.1	A loss of communication for a period of time to a Local Controller should not prevent that Local Controller from resuming communication (all functions) once communication is restored.	Mandatory		✔			Supported.
29.3.2	A delay in communication due to high network latency for a period of time to a Local Controller should not prevent that Local Controller from operating normally.	Mandatory		✔			The D4 local software is not dependent on network communications for operations. System commands can be maintained for a user configurable period of time.
29.4	The Local Controller Software shall have the ability to communicate with detector equipment via the SDLC interface when installed in a 332 or 336 cabinet		Desired	✔			Supported.
29.5	The Local Controller Software shall support the triggering of all preempts from an external source via the Ethernet port.		Desired	✔			Remote preempts from other source via Ethernet is supported. Additionally remote calls, remote soft preempt, remote priority and remote manual control is supported.
29.6	The Local Controller Software shall support the triggering of all transit priority features from an external source via the Ethernet port.		Desired	✔			Remote priority from other sources via Ethernet is supported. Additionally remote calls, remote soft preempt, remote preempt and remote manual control is supported.
29.7	The Local Controller Software shall have the ability to receive every input via the Ethernet port.		Desired	✔			Several inputs can be applied directly and then can be remapped to any input in the controller. Frequently used inputs can be added to the software by request so that the indirect method does not have to be used.
29.8	The Local Controller Software shall provide buffering capability of all data so that a temporary loss in communication does not result in a loss of real-time data being sent to central.	Mandatory		✔			The D4 currently buffers up to 6000 events that can be retrieved in the event of a communications loss.

NTCIP Compliance Statements

The D4 local control software complies with all applicable National Transportation Communication for ITS (NTCIP) currently approved standards documents. All NTCIP messaging called for in the Requirements of this Request for Proposals is met by the current version of the D4 local software. Any updates to the NTCIP objects requiring updates to the D4 software through the procurement stage, project stage and one (1) year beyond the initial acceptance of the D4 software by the Cities will be provided at no charge. Standard ranges are used for objects defined by NTCIP Standards 1201 and 1202. A Profile Implementation Conformance Statement (PICS) will be provided.

Schedule (includes Planning, Design, Implementation, Testing & Final Release)

We propose a 4-month schedule to deliver the remainder of the features identified as Available with Configuration in the compliance matrix. Some items may require coordination with the City of Austin and Kimley-Horn which may impact the schedule.

Category	Time Required
Planning	2 weeks
Design	2 weeks
Implementation	2 months
Testing	1 month
Final Release	2 weeks

Fourth Dimension Traffic
D4 Traffic Signal Controller Software License Agreement

Licensee: City of Austin

License Number(s): 14001 – 14005

Number of Licenses: 5

Date: February 16, 2017

1. Grant of License: Fourth Dimension Traffic ("4DT") grants to Licensee a revocable, non-transferable, nonexclusive license to use the D4 Software in object code by installing it onto Licensee's traffic signal controller unit provided Licensee complies with the terms and conditions of this Agreement. Furthermore, 4DT grants to Licensee a revocable, non-transferable, nonexclusive license to install the D4 Software onto one additional traffic signal controller unit solely for purposes of bench testing or other non-field operation.

2. Intellectual Property Rights Notice: The D4 Software and all rights, without limitation including proprietary rights therein (including any all copyrights, patents, trademarks, trade secrets, and publicity rights), are owned by 4DT. The D4 Software is protected for 4DT on the basis of copyright law and international treaty provisions as well as on the basis of other laws and agreements regarding intellectual property. Except as expressly and unambiguously provided herein, Licensee does not possess, and 4DT does not grant to Licensee, any express or implied rights (whether by implication, estoppel or other legal theory) in or to any such intellectual property rights and all such rights are retained by 4DT.

3. Term; Termination: This License is effective from the first date Licensee accesses or otherwise uses the D4 Software. Without prejudice to any other rights of 4DT, this Agreement shall terminate automatically and immediately without notice if Licensee violates or fails to comply with the terms and conditions set forth in this Agreement. Licensee may terminate this license at any time by uninstalling the D4 Software from the traffic signal controller unit in which it is installed, and destroying all related D4 Software Materials provided to Licensee relative to the D4 Software or Releases.

Documentation

User manuals, installation guides, MIBs and any other documentation will be provided upon contract award in electronic format. The manual is provided in PDF format with full search capabilities. Over the course of the contract, updated documentation will be provided as appropriate. The manual and other materials may be reproduced and distributed without restriction to any City employee and any contractor involved with the use or support of the D4 firmware for the City of Austin or the City of San Antonio.

Proposed Solutions

Most requirements with this project are met by the current version of the D4 firmware; however, some software development will take place early in the project to meet the other requirements. After the software development is complete, the software will be thoroughly tested by Advanced Traffic Solutions. We will provide a Beta version so that the City of Austin has an opportunity to comment on the implementation of new features and to bench test on their own if desired. MIBs will be shared with the central system provider to ensure that all of the functionality desired by the City of Austin and the City of San Antonio will be supported in both the local and central software systems. Hardware orders will be processed as soon as they are received from the City and the lead times for receiving that equipment will be provided.

Prior to deployment of any field controllers a comprehensive training program will be completed with City personnel so that the City of Austin and the City of San Antonio have a firm understanding of the operation and maintenance of the D4 local control software. Advanced Traffic Solutions has a comprehensive training program that tailors the training to specific audiences (managers, engineers, technicians, etc.). The presenter will typically telnet into an actual controller running on a test box so that the exact front panel screens can be displayed and the inputs/outputs to the cabinet can be observed in real time. This allows the attendees to get familiar with the actual menu structure and real-time status screens that they will see on the controller. Training materials such as a syllabus and training handouts including projector slides, example databases, and figures will be provided to the City for review prior to the training.

We recommend that a general training of the software be at least a full day. We typically will provide instruction on the controller features in the morning and then use the afternoon as a more informal training where we go through hands-on examples, solve actual scenarios and provide a more relaxed setting for questions and answers. We believe that the most effective learning will occur when engineers and technicians are implementing real world examples into the controller software rather than simply listening to us talk about the controller features. That is why we always have a live controller available during the training so that we can program scenarios and see exactly what they do on the active status displays and cabinet outputs.

The training can easily stretch into a second day depending on the number of questions and examples that we implement. Depending on the current needs we will provide up to 4 days of initial training for this project. We also provide annual 1-day refresher courses that will cover existing and new features to any agency that has an active maintenance contract. These courses would be included as part of this project for the initial contract period and would continue after the initial contract as part of the maintenance agreement.

We also have more in depth training for some of the more complex modules of the software including coordination, preemption, and transit signal priority. It is typically good to break these up into a later session so that attendees have an opportunity to learn the controller basics before moving onto the more advanced topics but we can accommodate whatever schedule the City requires. The presenters also use simulation models for some of the more advanced

classes to demonstrate how D4 would handle transit priority and the more complex operations (as a system). The full version of D4 for VISSIM is used to model the latest features and pass the final settings along to the actual controller without the need to reenter the data. The same database editor that is used for the actual controller also passes the data to the virtual controller(s).

Advanced Traffic Solutions will also provide training and oversight for the conversion and deployment of the first 20 databases. Our staff has substantial experience with the NextPhase platform and will be able to use this expertise during the conversion of databases from NextPhase to D4. We understand that this is not simply a project to replace firmware to achieve the same functionality, the new firmware should work with the central system to provide the appropriate tools that will promote mobility and help Cities manage congestion with the main objective of leveraging resources and being able to do more with less.

During the conversion of databases, we would evaluate whether any of D4's advanced features would be appropriate for implementation at existing intersections. The City should expect a software that is not only easier to use but that provides tangible results in the form of a more efficient and safer transportation system. Advanced features of interest to the City may include support of flashing yellow arrows with several different operating modes, native support of pedestrian hybrid beacons (HAWKs), advanced transit signal priority features, and advanced coordination features to minimize disruption due to transition and oversize pedestrian phases. After completing the initial database conversions and field deployments we will be available to answer questions and provide software support.

We are also available to provide full database conversion services on an as needed basis. Advanced Traffic Solutions, LLC is a traffic engineering firm that understands both controller operation and traffic engineering fundamentals. Our database conversions typically go beyond just merely translating values from one controller platform into another, we will usually use any advanced features that would be appropriate in the new controller platform. We will also help getting the new local controller firmware integrated with existing field components such as the communications system and the existing detection system. We commit to working with Kimley-Horn to ensure a seamless, integrated system between local and central.

The transit priority and emergency vehicle priority (aggressive priority) features in the D4 controller are the most flexible and advanced priority modules available on the market today. We are confident that all functionality currently available in the Prioritor function of NextPhase version 1.7.7 will be exceeded by the D4 firmware. Advanced Traffic Solutions sees ourselves as a partner to the Cities of Austin and San Antonio and we will be 100% invested in making this project a success including ensuring that all Priority and Preempt functionality required by this project will be supported by the supplied software. We have worked with Kimley-Horn on numerous projects and have a close working relationship with them that will ensure that the City gets the highest quality project and a seamless solution between central system and local software avoiding any situation where one vendor is pointing the finger at the other vendor. We pledge to share openly with Kimley-Horn and the Cities any information needed to meet the technical requirements of this project. We understand the significant investments the Cities have already made into their KITS system and we see this as an opportunity to provide software that will leverage and enhance the central system functionality already available.

Tab G. Matrix of Exceptions

Category	Requirement/Description	Mandatory /Desired	Cannot be Provided as Part of the Project	Comments
1.11	Data entry and modification shall be accessible via a web-enabled interface hosted on the local controller and accessible via the controller's programmed IP address or host name when on an IP network.	Desired	Cannot be Provided as Part of the Project	We currently support intersection status via a web browser. Data entry / modification is also available on the network via telnet. We have explored the web based option and have discovered several limitations to this approach. The capabilities of the hosted interface will vary depending on controller hardware therefore functionality demonstrated on one hardware platform may vary or be unavailable on another hardware platform. We propose to meet this capability alternatively through telnet and through a desktop based editor which we believe will enhance the user experience and will support all of the hardware types required in this RFP.

No other exceptions taken.

Tab H. Authorized Negotiator

The authorized negotiator and binding decision maker for all contract matters regarding this RFP is Mr. Eric J. Nelson.

Name: Eric J. Nelson, P.E.
Address: 3505 Sage Road, Suite 2309
Houston, TX 77056-7182
E-Mail: eric@advtraffic.com
Phone: (832) 405-8577

Tab I. Cost Proposal

The controller hardware (Items 6 through 8) will come with software pre-installed but the pricing provided assumes that the license is purchased separately in item 1.

Item 4 assumes a site license was purchased or has become active based on the level of individual licenses purchased. Maintenance can be provided at the rate of 10% of the individual license fees paid until the site license becomes active.

AUSTIN TRANSPORTATION DEPARTMENT
PURCHASING OFFICE
ITEM 0601 – PRICE FORM, LOCAL CONTROLLER SOFTWARE
SOLICITATION NUMBER: RFP JTH0309

	Bid Item Description	**Mandatory**	**Basis of Bid Quantity**	**Unit Price**	**Total**
	SOFTWARE				
1	Local controller software license fee, when purchased individually	Yes	500	$650	$325,000
2	Local controller software license fee, site license Number of individual intersections at which point the site license becomes active: _____900_____.	Yes			$585,000
3	Training, per 8 hr. day (Offeror may expand as necessary to provide clarity—attach pricing schedule to this form)	Yes	3	$3,500	$10,500
4	Maintenance and Support, per year	Yes	1	$60,000	$60,000
	HARDWARE				
5	Model 2070 (Linux operating system, 64 MB SDRAM, 16 MB Flash Memory, 8x40 LCD display)	Yes	1	$1,680	$1,680
	Model 2070 Components:				
6	Model 2070 1C card, with controller software installed, and includes: (Compliant to ATC 5.2b, ATC 6.1 (or latest), open Linux operating system, 3.3v datakey socket, 2 10/100 RJ45 Ethernet ports, TEES compliant D Type 25 pin C125 port, 1 USB port, 64 MB SDRAM, 16 MB Flash memory, 400 MH core speed)	Yes	500	$540	$270,000
7	Model 2070 1E card, with controller software installed, and includes: (compliant to TEES 2009, OS-9 RTOS, 32 MB PSRAM, 8 MB flash memory, 2 MB non-volatile SRAM, 2 10/100 RJ45 Ethernet ports)	Yes	1	$480	$480
8	ATC Controller, fully loaded Includes 2070 ATC CPU module, 2070 2B or 2E Field I/O Module, 2070 3B LCD front panel module, 2070 4A power module.	Yes	500	$1,680	$840,000
	SERVICES (may use fields provided or attach additional pricing schedule with this Price Form)				
9	Database conversion, low complexity	Desired		$400	
10	Database conversion, medium complexity	Desired		$800	
11	Database conversion, high complexity	Desired		$1,200	
12	Field installation of controller	Desired		$800	

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GOAL DETERMINATION REQUEST FORM

Buyer Name/Phone	Jim Howard/974-2031	**PM Name/Phone**	Anthony Hall anthony.hall@austintexas.gov (512)-974-4005
Sponsor/User Dept.	Austin Transportation	**Sponsor Name/Phone**	Anthony Hall anthony.hall@austintexas.gov (512)-974-4005
Solicitation No	RFPJTH0309	**Project Name**	Traffic Management Software
Contract Amount	$3,000,000.00	**Ad Date (if applicable)**	

Procurement Type

- ☐ AD – CSP
- ☐ AD – Design Build Op Maint
- ☐ IFB – IDIQ
- ☐ Nonprofessional Services
- ☐ Critical Business Need
- ☐ Sole Source*
- ☐ AD – CM@R
- ☐ AD – JOC
- ☒ PS – Project Specific
- ☐ Commodities/Goods
- ☐ Interlocal Agreement
- ☐ AD – Design Build
- ☐ IFB – Construction
- ☐ PS – Rotation List
- ☐ Cooperative Agreement
- ☐ Ratification

Provide Project Description**

Upgrade of the current traffic signal controller softwre (software) with new software that will provide an operating system installed on the City's traffic signal controllers. The City of San Antonio and other communities will have the opportunity to purchase off of this contract in order to promote regional consistency in standards and to encourage a system where the different entities can communicate with each other systems. All software and applications.

Project History: Was a solicitation previously issued; if so were goals established? Were subcontractors/subconsultants utilized? Include prior Solicitation No.

No history with this solicitation.

List the scopes of work (commodity codes) for this project. *(Attach commodity breakdown by percentage; eCAPRIS printout acceptable)*

92032--100% There is NOT A Commodity Code (NAME) by this number. SEK

Jim Howard	11/22/2016
Buyer Confirmation	**Date**

** Sole Source must include Certificate of Exemption*
***Project Description not required for Sole Source*

FOR SMBR USE ONLY

Date Received	11/23/2016	**Date Assigned to BDC**	11/23/2016

In accordance with Chapter2-9(A-D)-19 of the Austin City Code, SMBR makes the following determination:

[7] Goals	% MBE	% WBE
☐ Subgoals	% African American	% Hispanic

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GOAL DETERMINATION REQUEST FORM

	% Asian/Native American	% WBE
☐ Exempt from MBE/WBE Procurement Program	☒ No Goals	

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GOAL DETERMINATION REQUEST FORM

This determination is based upon the following:	
☐ Insufficient availability of M/WBEs	No availability of M/WBEs
☐ Insufficient subcontracting opportunities	☒ No subcontracting opportunities
☐ Sufficient availability of M/WBEs	☐ Sufficient subcontracting opportunities
☐ Sole Source	☐ Other
If Other was selected, provide reasoning:	
MBE/WBE/DBE Availability	
Provide information on availability.	NO MBE/WBE Availability. SRK
Subcontracting Opportunities Identified	
List any subcontracting opportunities identified.	There were no Subcontracting opportunities identified. SRK

Counselor Name Steele Richerson-Kynley	12/08/2016
SMBR Staff	**Signature/ Date**
SMBR Director or Designee	**Date** 12/8/16
Returned to/ Date:	

CERTIFICATE OF INTERESTED PARTIES

FORM 1295

Complete Nos. 1 - 4 and 6 if there are interested parties.
Complete Nos. 1, 2, 3, 5, and 6 if there are no interested parties.

OFFICE USE ONLY
CERTIFICATION OF FILING

Certificate Number:
2017-245429

Date Filed:
08/04/2017

Date Acknowledged:

1 Name of business entity filing form, and the city, state and country of the business entity's place of business.

Advanced Traffic Solutions, LLC
Katy, TX United States

2 Name of governmental entity or state agency that is a party to the contract for which the form is being filed.

City of Austin, TX

3 Provide the identification number used by the governmental entity or state agency to track or identify the contract, and provide a description of the services, goods, or other property to be provided under the contract.

MA-5600-NC170000039
Traffic Signal Controller Software and Related Traffic Engineering Services

4 Name of Interested Party	City, State, Country (place of business)	Nature of interest (check applicable)	
		Controlling	Intermediary
Nelson, Eric	Katy, TX United States	X	

5 Check only if there is NO Interested Party. ☐

6 AFFIDAVIT

I swear, or affirm, under penalty of perjury, that the above disclosure is true and correct.

NOTARY PUBLIC
STATE OF TEXAS
MARY E GARCIA
My Commission Expires
May 17, 2019

Eric J Nelson
Signature of authorized agent of contracting business entity

AFFIX NOTARY STAMP / SEAL ABOVE

Sworn to and subscribed before me, by the said Eric J. Nelson, this the 4 day of August, 20 17, to certify which, witness my hand and seal of office.

Signature of officer administering oath | Mary Garcia — Printed name of officer administering oath | Notary — Title of officer administering oath